

2020 GHGRP DATA HIGHLIGHTS

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GHGRP 2020: Reported Data

For reporting year (RY) 2020, over 8,000 facilities and suppliers reported to the greenhouse gas reporting program. Among these reporters,

- 7,608 facilities in nine industry sectors reported direct emissions.
- Reported direct emissions totaled 2.71 billion metric tons carbon dioxide equivalent (CO₂e), about half of total U.S. greenhouse gas emissions;
- 966 suppliers of fossil fuels and industrial gases reported; and
- 87 facilities reported injecting CO₂ underground.

Summary GHGRP data has been broken into several sections.

All emissions presented here reflect the most recent information reported to EPA as of 8/7/2021. The reported emissions exclude biogenic CO₂. GHG data displayed here in units of carbon dioxide equivalent (CO₂e) reflect the global warming potential (GWP) values from Table A-1 of 40 CFR 98, which is generally based on the IPCC AR4, with the addition of GWPs from the IPCC AR5 fluorinated GHGs that did not have GWPs in the AR4.

Greenhouse Gas Reporting Program Background

As directed by Congress, EPA's Greenhouse Gas Reporting Program (GHGRP) collects annual greenhouse gas information from the top emitting sectors of the U.S. economy (Table 1). The GHGRP is the only dataset containing facility-level greenhouse gas (GHG) emissions data from large industrial sources across the United States. With seven consecutive years of reporting for most sectors, GHGRP data are providing important new information on industrial emissions—showing variation in emissions across facilities within an industry, variation in industrial emissions across geographic areas, and changes in emissions over time at the sector and facility level. EPA is using this facility-level data to improve estimates of national greenhouse gas emissions in the [U.S. Greenhouse Gas Inventory](#).

This document summarizes national industrial sector emissions and trends.

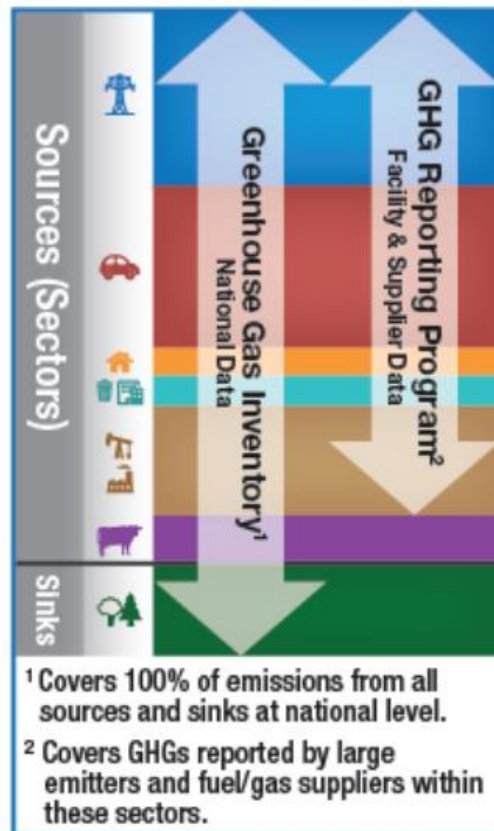
Table 1: GHGRP Sector Classifications

Power Plants	Refineries	Chemicals	Fluorinated Chemicals	Waste
– Electricity Generation	– Petroleum Refineries	– Adipic Acid Production – Ammonia Manufacturing – Hydrogen Production – Nitric Acid Production – Phosphoric Acid Production – Petrochemical Production – Silicon Carbide Production – Titanium Dioxide Production – Other Chemicals Production	– Fluorinated Gas Production – HCFC-22 Production/ HFC-23 Destruction	– Municipal Landfills – Industrial Waste Landfills – Industrial Wastewater Treatment – Solid Waste Combustion
Metals	Minerals	Pulp & Paper	Petroleum & Natural Gas Systems – Direct Emissions	
– Aluminum Production – Ferroalloy Production – Iron & Steel Production – Lead Production – Zinc Production – Magnesium Production – Other Metals Production	– Cement Production – Glass Production – Lime Manufacturing – Soda Ash Manufacturing – Other Minerals Production	– Chemical Pulp & Paper Manufacturing – Other Paper Producers	– Onshore Production – Offshore Production – Gathering and Boosting – Natural Gas Processing – Natural Gas Trans. Comp. – Natural Gas Trans. Pipelines – Natural Gas Distribution – Underground Natural Gas Storage – Liquefied Natural Gas Storage – Liquefied Natural Gas Imp./Exp. – Other Petroleum and Natural Gas Systems	
Miscellaneous Combustion Sources	Electrical Equipment	Electronics Manufacturing	Mining	
– Stationary Fuel Combustion Sources at facilities that are not part of any other sector, including Food Processing, Ethanol Production, General Manufacturing, Universities, Military Installations, Others	– Electrical Equipment Manufacture & Refurbishment – Electrical Transmission and Distribution Equipment Use	– Electronics Manufacturing	– Underground Coal Mines	
Carbon Dioxide Supply and Injection	Petroleum Product Suppliers	Natural Gas and NGL Suppliers	Industrial Gas Suppliers	
– Suppliers of CO ₂ – Injection of CO ₂ – Geologic Sequestration of CO ₂	– Suppliers of Coal-Based Liquid Fuels – Suppliers of Petroleum Products	– Fractionators of Natural Gas Liquids – Local Natural Gas Distribution Companies	– Suppliers of Industrial Greenhouse Gases – Imports and Exports of Equipment Pre-charged with Fluorinated GHGs or Containing Fluorinated GHGs in Closed-cell Foams	

The GHGRP does not represent total U.S. GHG emissions, but provides facility level data for large sources of direct emissions, thus representing the majority of U.S. GHG emissions. The GHGRP data collected from direct emitters represent about half of all U.S. emissions. When including greenhouse gas information reported to the GHGRP by suppliers, emissions coverage reaches approximately 85–90% (See Figure 1). [Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2019](#) contains information on all GHG emissions sources and sinks in the United States.

[Learn more](#) about the differences between the Inventory and the GHGRP.

Figure 1: U.S. Greenhouse Gas Inventory and the Greenhouse Gas Reporting Program



Suppliers report the quantity of GHGs that would be emitted if the fuels and industrial GHGs that they place into the economy each year are used/released. Emissions associated with these fuels and industrial gases do not occur at the supplier’s facility but instead occur throughout the country, wherever they are used. An example of this is gasoline, which is supplied into the U.S. economy by a relatively small number of entities and consumed by many individual vehicles throughout the country. The majority of GHG emissions associated with the transportation, residential, and commercial sectors are accounted for by these suppliers. This document focuses on data reported by direct emitters. Data reported by suppliers can be viewed through the suppliers section of the Facility Level Information on GreenHouse gases Tool ([FLIGHT](#)). Learn more about suppliers and their 2020 reported data.

Table 2: Overview of GHG Data Reported (2020)

Direct emitters	
Number of facilities reporting	7,634

Reported direct emissions (billion metric tons CO ₂ e)	2.60
Suppliers of fuel and industrial gases	
Number of suppliers	975
Underground injection of carbon dioxide	
Number of carbon dioxide injection facilities	93

Who reports?

For 2020, 7,634 direct emitters submitted a GHG report. The Petroleum and Natural Gas Systems sector had the largest number of reporting facilities, followed by the Waste Sector and the Power Plants Sector. Among suppliers, Suppliers of Natural Gas and Natural Gas Liquids had the largest number of reporting facilities.

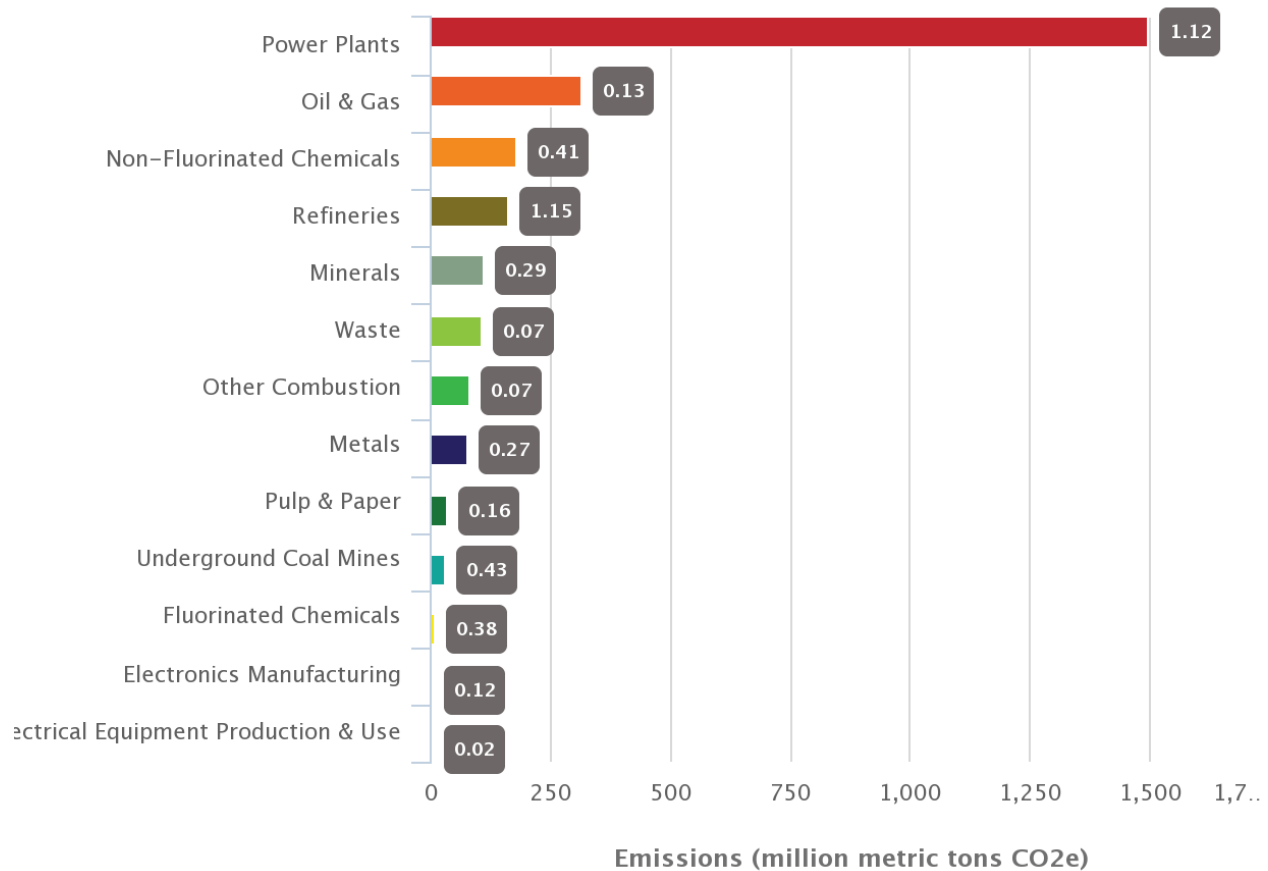
Table 3: Number of Direct Emitters that Reported (2020)

Industry Sector	Number of Reporters ¹
Power Plants	1,339
Petroleum and Natural Gas Systems	2,377
Refineries	140
Chemicals	452
• <i>Fluorinated Chemicals</i>	17
• <i>Non-fluorinated Chemicals</i>	436
Waste	1,465
Metals	294
Minerals	379
Pulp and Paper	221
Other	1,320
• <i>Underground Coal Mines</i>	71
• <i>Electrical Equipment Production & Use</i>	94
• <i>Electronics Manufacturing</i>	48
• <i>Other Combustion</i>	1,107

Reported Emissions

In 2020, 2.6 billion metric tons CO₂e were reported by direct emitters. The largest emitting sector was the Power Plant Sector with 1.5 billion metric tons CO₂e, followed by the Petroleum and Natural Gas Systems Sector with 316 million metric tons (MMT) CO₂e and the Chemicals Sector with 184 MMT CO₂e (non-fluorinated and fluorinated chemicals combined). This information, as well as average emissions per reporter, is shown in the following chart.

¹ Totals sum to more than 7,634 because facilities whose activities fall within more than one sector are counted multiple times.

Figure 2: Direct GHG Emissions Reported by Sector (2020)

[View this information in FLIGHT.](#)

GHGRP Calculation Methods Used

The GHGRP prescribes methodologies that must be used to determine GHG emissions from each source category. Reporters generally have the flexibility to choose among several methods to compute GHG emissions. The decision of which method to use may be influenced by the existing environmental monitoring systems in place and other factors. Reporters can change emission calculation methods from year to year and within the same year, as long as they meet the requirements for use of the method selected.

Additional information on the [methodologies that reporters use to determine GHG emissions.](#)

Report Verification

All reports submitted to EPA are evaluated by electronic validation and verification checks. If potential errors are identified, EPA will notify the reporter, who can resolve the issue either by providing an acceptable response describing why the flagged issue is not an error or by correcting the flagged issue and resubmitting their annual GHG report.

Additional information describing [EPA's verification process in more details.](#)

For More Information

For more detailed information from each industrial sector, view the industry sections below.

Use [FLIGHT](#) to view maps of facility locations, obtain summary data for individual facilities, create customized searchers, and display search results graphically.

Downloadable spreadsheets containing summary data reported to the GHGRP from each reporter are available on the [Data Downloads](#) page.

All other publicly available data submitted to the GHGRP are available for download through [Envirofacts](#).

The [U.S. Greenhouse Gas Inventory](#) contains information on all sources of GHG emissions and sinks in the United States from 1990 to 2019.

All GHG emissions data reflect the global warming potential (GWP) values from the Fourth Assessment Report (AR4) of the Intergovernmental Panel on Climate Change (*Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, Pachauri, R.K. and Reisinger, A. (eds)]. IPCC, Geneva, Switzerland, 2007*). The AR4 values also can be found in the current version of Table A-1 in subpart A of 40 CFR part 98.

Emissions Trends

National level trends in greenhouse gas emissions are available through the [Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2018](#) (April 2022). The GHGRP is different from the U.S. GHG inventory in that it collects information from the largest stationary sources in the U.S. and provides nearly complete emissions coverage for many of the largest emitting industries. Trends in emissions reported for individual industries are discussed in the industry-specific reports.

The U.S. GHG Inventory is not yet available for 2020. For sources reporting to the GHGRP, emissions decreased by 8.9% from 2019 to 2020. Over the past ten reporting years (2011-2020), GHGRP reported direct emissions from sectors other than oil and gas (also excluding suppliers) declined by 26.2%. This decline is primarily caused by a 33% decline in reported power plant emissions since 2011.

Table 4: Emissions Trends for U.S. GHG Inventory and GHGRP (2011-2020)

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
U.S. GHG Inventory										
Total emissions (million metric tons CO ₂ e)	6,827.4	6,585.9	6,764.7	6,825.0	6,671.1	6,520.3	6,483.3	6,671.4	6,558.3	Not available
Percent change in emissions from previous year	—	-3.5%	2.7%	0.9%	-2.3%	-2.3%	-0.6%	2.9%	-1.7%	Not available
GHGRP										
Number of direct-emitting facilities	7,645	7,896	7,985	8,209	8,052	7,672	7,587	7,686	7,688	7,634
Direct emissions (million metric tons CO ₂ e)	3,318.4	3,169.3	3,189.6	3,204.0	3,058.2	2,994.7 ¹	2,928.9 ¹	2,993.3 ¹	2,857.7 ¹	2,602.1 ¹
Percent change in emissions from previous year	—	-4.5%	0.6%	0.5%	-4.6%	-2.1%	-2.2%	2.2%	-4.5%	-8.9%

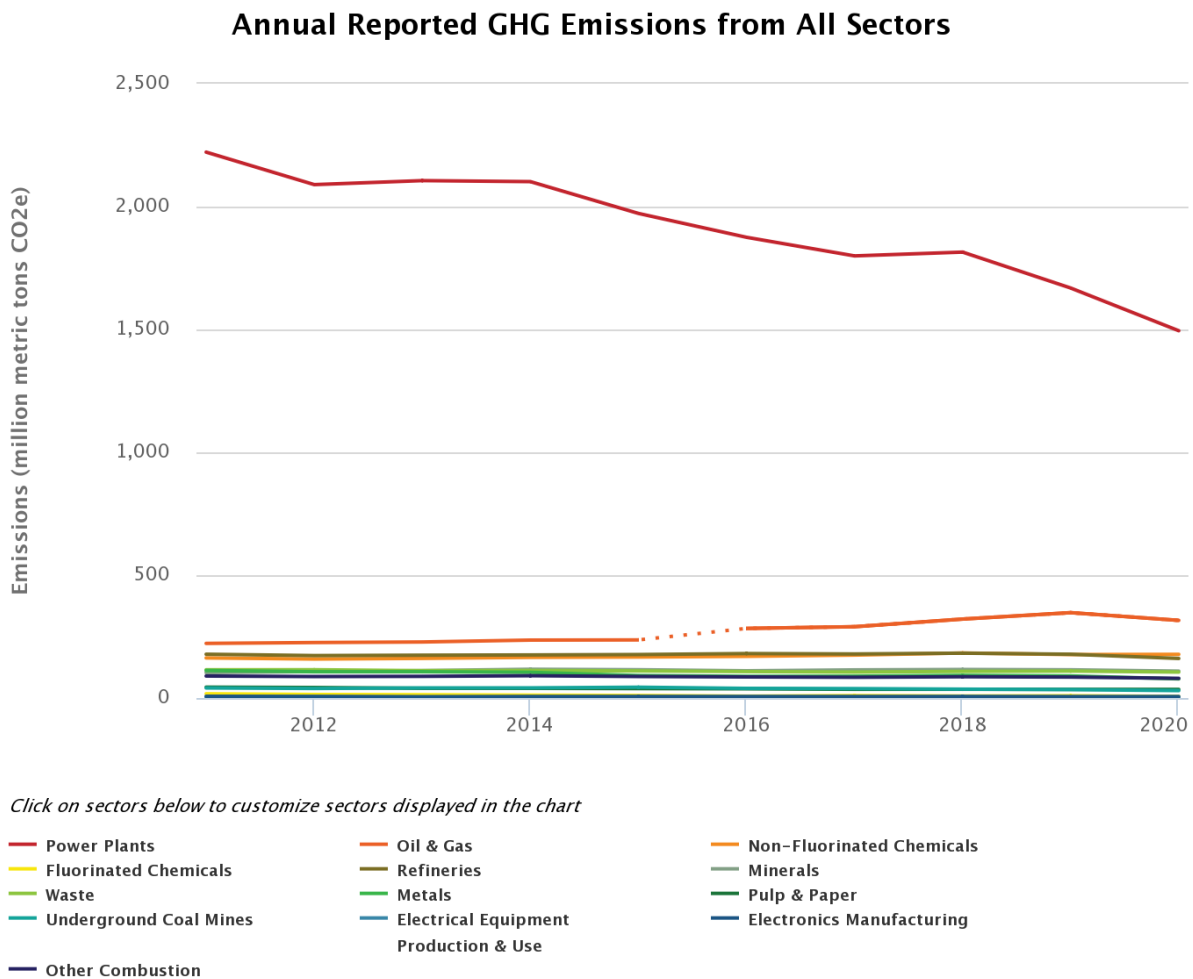
¹ GHG data for the Petroleum and Natural Gas Systems source category is not directly comparable between 2011-2015 and 2016 onward. Facilities in the Onshore Oil & Gas, Gathering & Boosting, and Onshore Gas Transmission Pipelines industry segments began reporting in 2016.

Table 5: Annual Emissions by Sector in MMT CO₂e (2011–2020)

Sector	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Power Plants	2,221.7	2,089.5	2,105.7	2,101.7	1,972.3	1,875.1	1,799.4	1,814.8	1,668.6	1,494.9
Oil & Gas	222.3	225.7	228.0	235.7	236.4	283.21	290.21	321.21	347.41	316.01
Chemicals	180.4	173.0	174.6	177.1	177.1	177.2	184.5	191.3	185.9	184.1
• Fluorinated Chemicals	17.3	14.4	13.4	11.7	10.3	7.6	9.9	8.1	9.1	6.4
• Non-fluorinated Chemicals	163.1	158.6	161.2	165.4	166.8	169.6	174.6	183.2	176.8	177.7
Refineries	178.2	172.6	174.3	175.3	176.9	180.9	179.2	182.5	178.1	160.9
Waste	114.9	115.0	111.3	111.9	110.3	107.5	105.6	108.3	109.6	105.5
Metals	112.0	106.8	106.9	104.5	91.4	88.3	88.8	92.2	90.0	77.9
Minerals	103.2	107.8	111.5	117.0	115.0	110.8	114.4	116.1	114.8	109.3
Pulp & Paper	44.2	42.8	39.4	39.3	38.4	37.5	35.4	35.5	35.2	35.0
Other	141.6	136.0	137.8	141.6	140.4	134.2	131.4	131.3	128.0	118.5
• Underground Coal Mines	40.9	38.8	41.0	41.2	43.9	39.2	38.2	36.0	34.2	30.2
• Electrical Equipment Production & Use	4.3	3.4	3.5	3.4	2.6	3.1	2.7	2.4	2.7	2.3
• Electronics Manufacturing	7.0	6.4	5.2	6.2	6.3	6.2	6.1	6.3	5.9	5.9
• Other Combustion	89.5	87.4	88.2	90.7	87.6	85.8	84.4	86.5	85.2	80.0

^a GHG data for the Petroleum and Natural Gas Systems source category is not directly comparable between 2011-2015 and 2016 onward. Facilities in the Onshore Oil & Gas gathering & Boosting and Onshore Gas Transmission Pipelines industry segments began reporting in 2016.

Figure 3: Trends in Direct GHG Emissions (2011-2020)^{2,3,4}



[View this information in FLIGHT.](#)

² Non-fluorinated Chemicals and Fluorinated Chemicals are components of “Chemicals” in FLIGHT.

³ Other Combustion, Underground Coal Mines, Electronics Manufacturing and Electrical Equipment Production & Use comprise “Other” in FLIGHT.

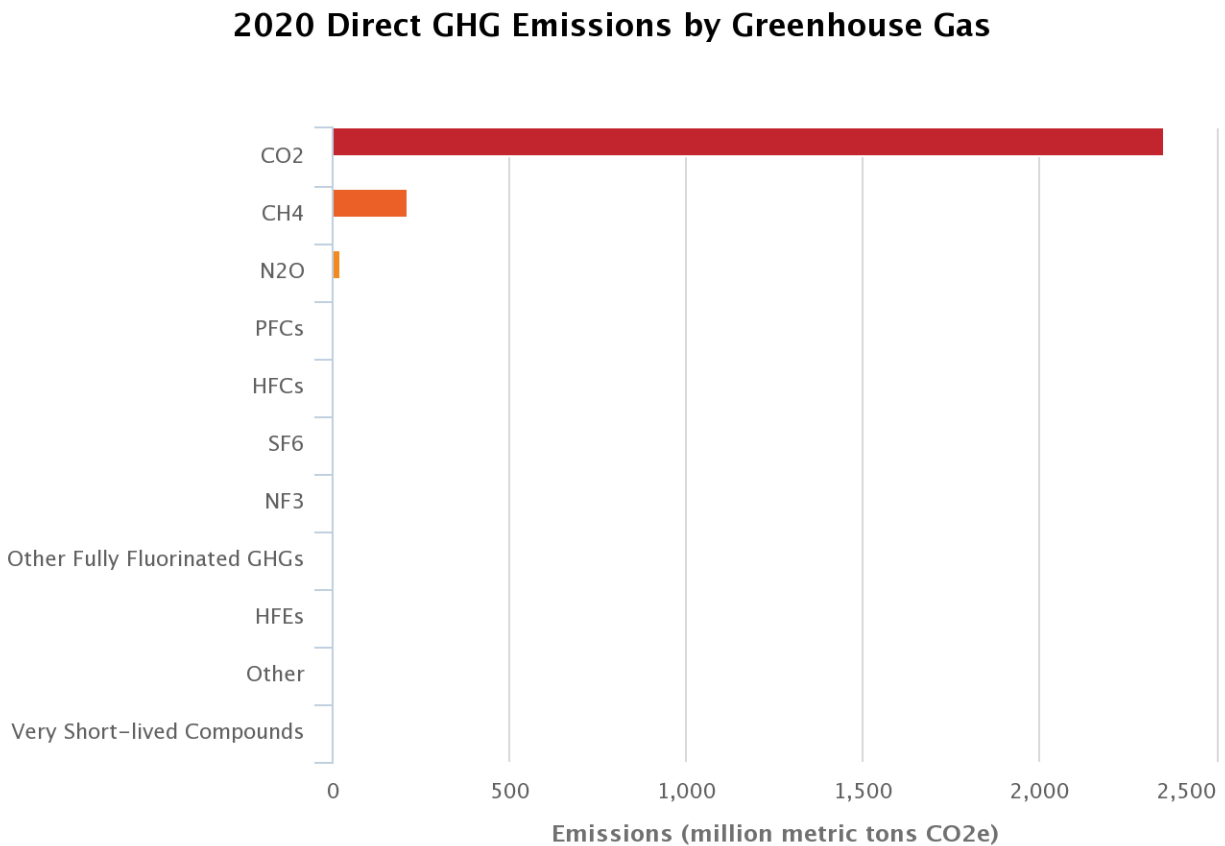
⁴ GHG data for the Petroleum and Natural Gas Systems source category is not directly comparable between 2011-2015 and 2016 onward. Facilities in the Onshore Oil & Gas gathering & Boosting and Onshore Gas Transmission Pipelines industry segments began reporting in 2016.

Emissions by GHG

Carbon dioxide is the GHG emitted in the largest quantities. The 2.35 billion metric tons of CO₂ reported for 2020 represent 90.4% of the GHGs reported in 2020^a. Methane emissions represent 8.1% of reported 2020 GHG emissions, N₂O represents 0.9%, and fluorinated gases (HFCs, PFCs, SF₆, NF₃, Other Fully Fluorinated GHGs, HFEs, Very Short Lived Compounds, Other) represent 0.6% (Figure 1).

^aThe Inventory of U.S. Greenhouse Gas Emissions And Sinks for 2020 is not yet available. In 2019, CO₂ represented 80.1% of total U.S. GHG emissions.

Figure 4: Direct Emissions by GHG (2020)



The table below lists the primary sectors emitting each GHG.

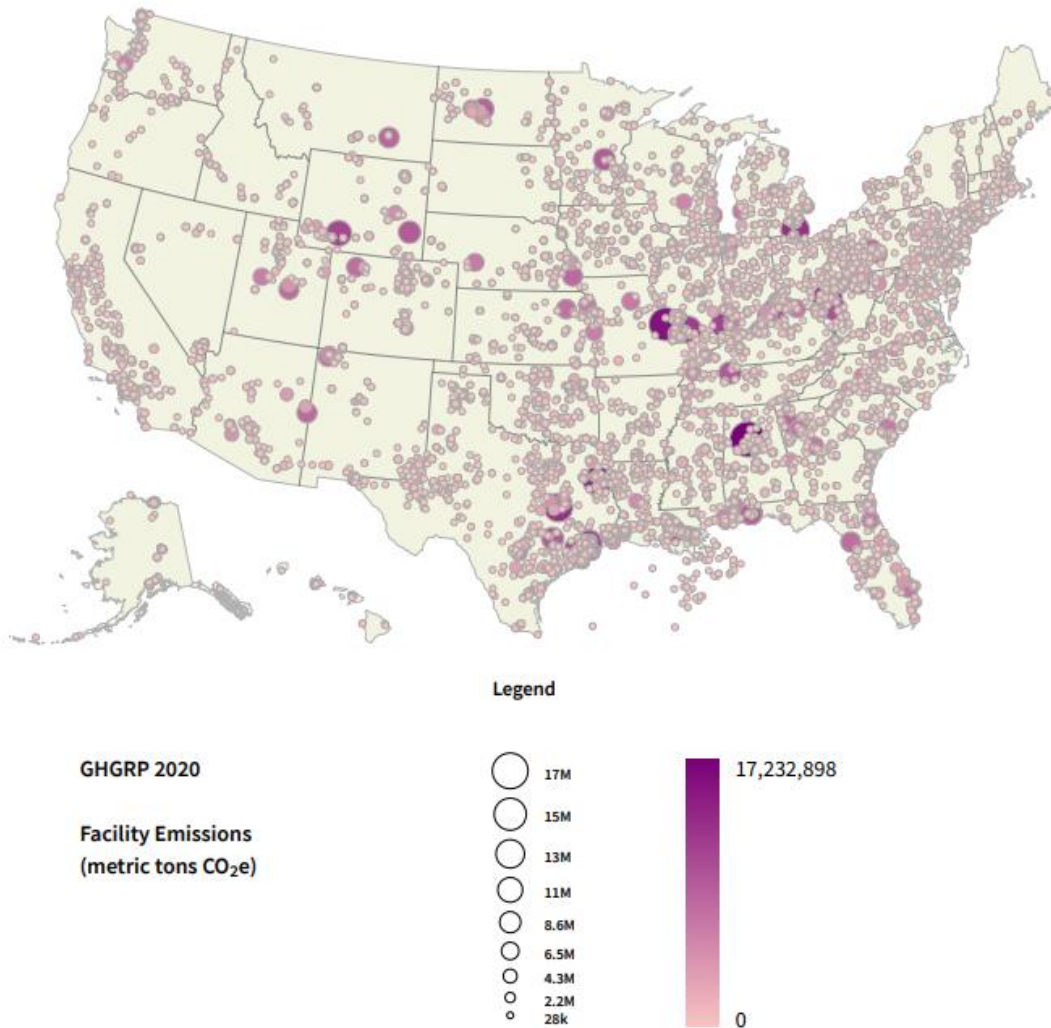
Table 6: Largest Sources of GHG Emissions

Greenhouse Gas	Source Categories Contributing Most to Emissions⁴	Sectors Contributing Most to Emissions
CO2	Electricity Generation (D), Stationary Combustion (C)	Power Plants, Petroleum and Natural Gas Systems, Refineries
CH4	Municipal Landfills (HH), Petroleum & Natural Gas Systems (W)	Waste, Petroleum and Natural Gas Systems, Underground Coal Mines
N2O	Nitric Acid Production (V), Adipic Acid Production (E), Electricity Generation (D)	Chemicals, Power Plants
PFCs	Electronics Manufacturers (I), Aluminum Production (F)	Other, Metals
HFCs	HCFC-22 Production and HFC-23 Destruction (O), Fluorinated Gas Production (L)	Chemicals
SF6	SF6 from Electrical Equipment (DD), Electronics Manufacturers (I)	Other
NF3	Fluorinated Gas Production (L), Electronics Manufacturers (I)	Chemicals, Other

⁴ These source categories account for 75 percent or more of the reported emissions of the corresponding GHG. The subpart under which the emissions were reported is shown in parentheses.

Emissions by Location

Figure 5: Location and Total Reported Emissions from GHGRP Facilities (2020)

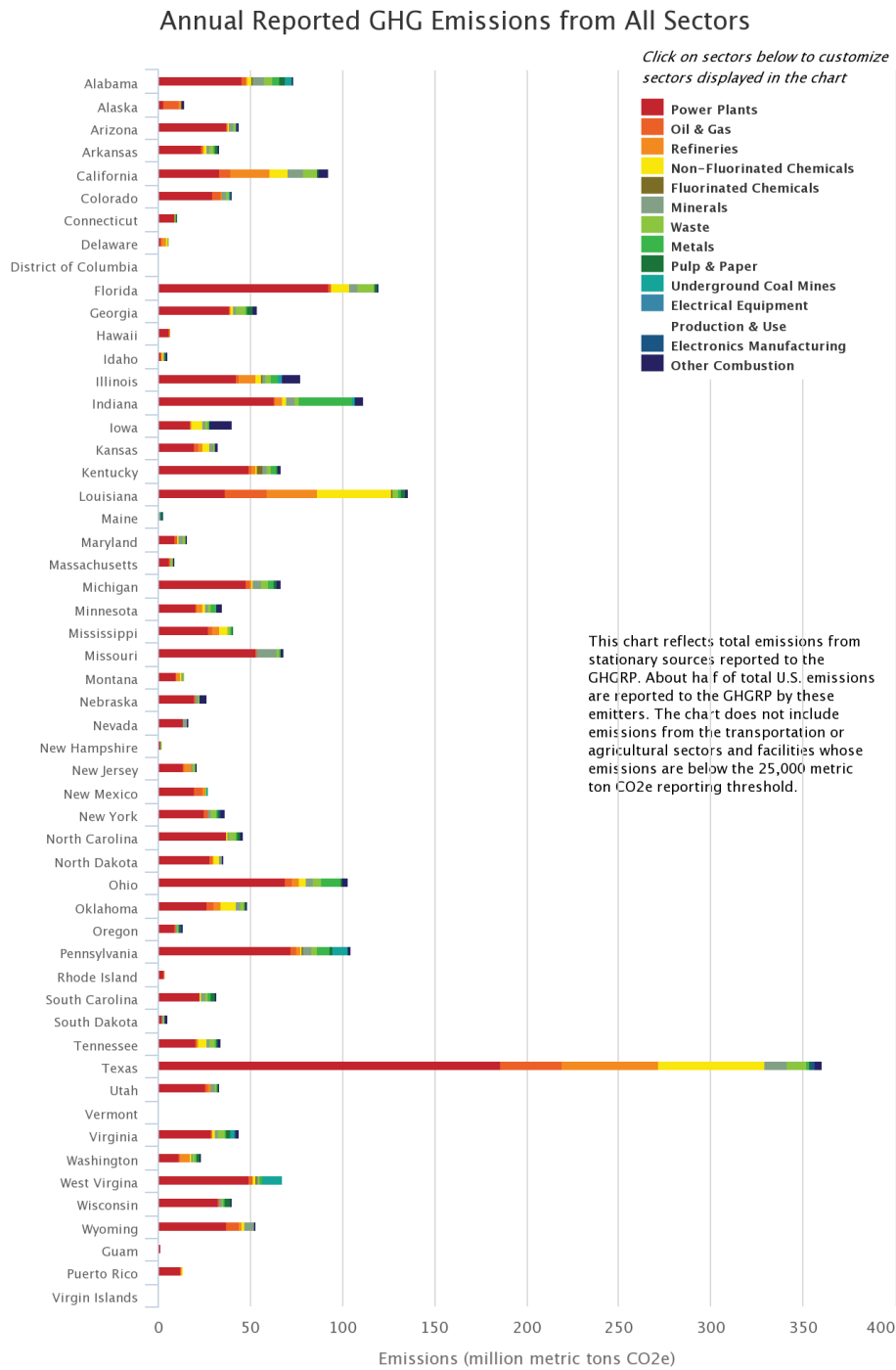


This map shows the locations of direct-emitting facilities. The size of a circle corresponds to the quantity of emissions reported by that facility. [There are also facilities located in Puerto Rico, the U.S. Virgin Islands, and Guam.](#)

Readers can identify facilities in their state, territory, county, or city by visiting [FLIGHT](#).

Because it generally applies to facilities that emit greater than 25,000 metric tons CO₂e per year, the GHGRP provides total reported emissions from large stationary sources in each state. Figure 6 shows the reported emissions in each state broken out by industrial sector.

Figure 6: Direct GHG Emissions by State and Sector (2020)

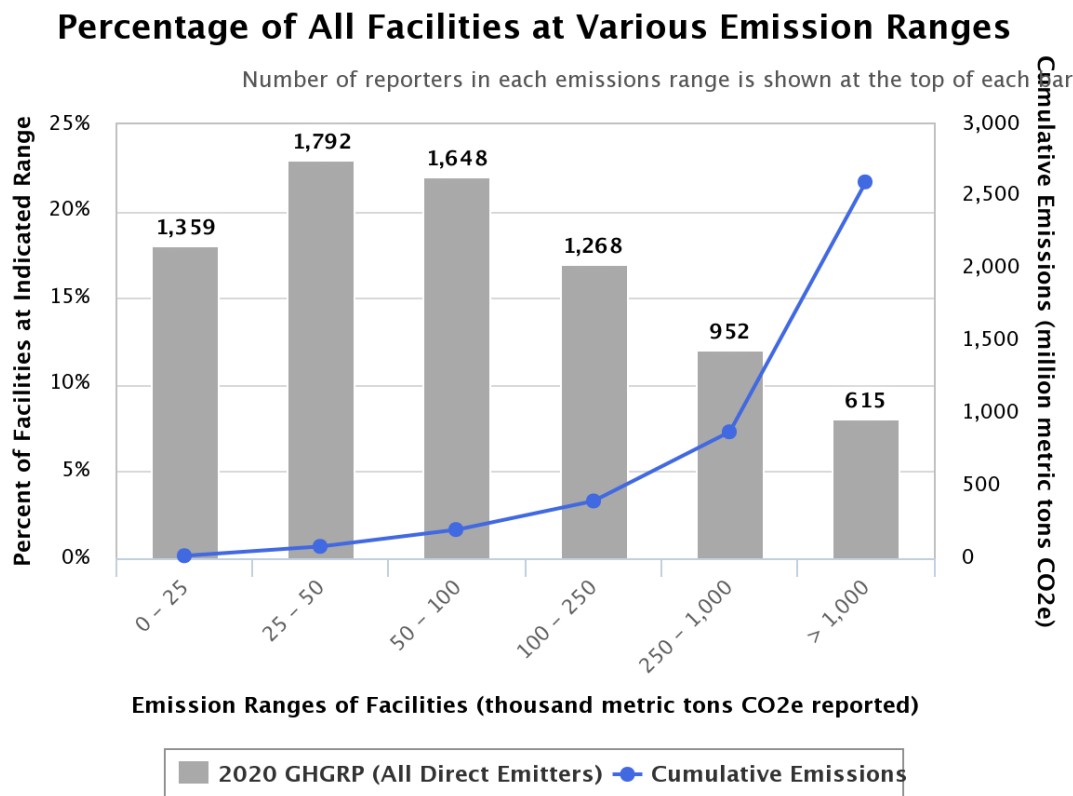


[View this information in FLIGHT.](#)

Emissions Ranges

The GHGRP provides a comprehensive dataset that can be used to determine the number of facilities at various emissions levels in many industry sectors. The GHGRP can also be used to determine the total GHG emissions from individual facilities, including emissions from fossil fuel combustion and other processes. This information is valuable for planning future policies. GHGRP data provide policy makers with a better understanding of the number of facilities and total emissions that would be covered by potential GHG reduction policies for various industries.

Figure 7: Percentage of All Reporting Facilities at Various Emission Ranges (2020)⁵

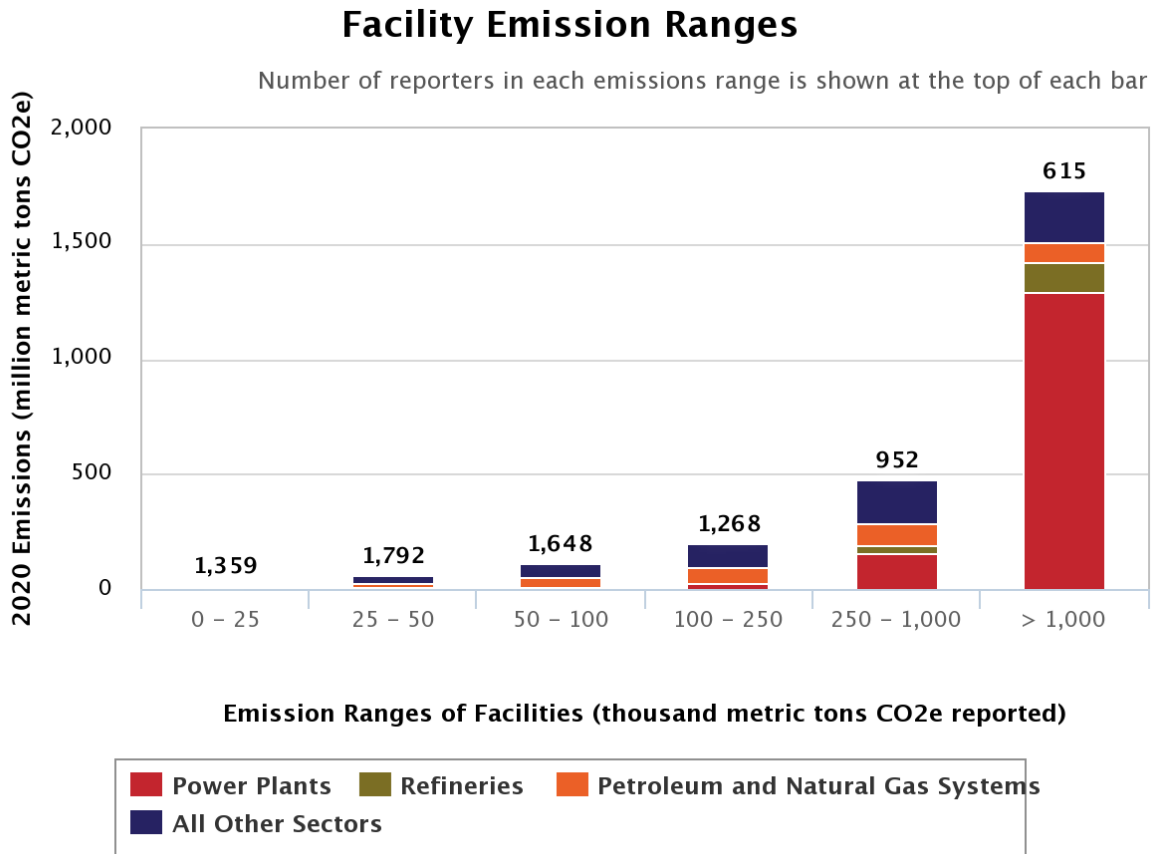


Seventy-nine percent of reporting facilities had emissions less than 250,000 metric tons CO₂e. In 2020, the 615 largest-emitting facilities—those emitting more than one million metric tons CO₂e—accounted for 1.73 billion metric tons CO₂e. These emissions represent 66.4% of the total 2.60 billion metric tons CO₂e reported. These high-emitting facilities are mainly power plants, but they also include facilities in all other direct emitter sectors.

You can use FLIGHT to [list and sort facilities based on total reported emissions](#). This tool also allows you to sort facilities by specific industry types.

⁵ Numbers at the top of the bars represent the number of reporters in that emissions range.

Figure 8: Facility Emission Ranges (2020)⁶

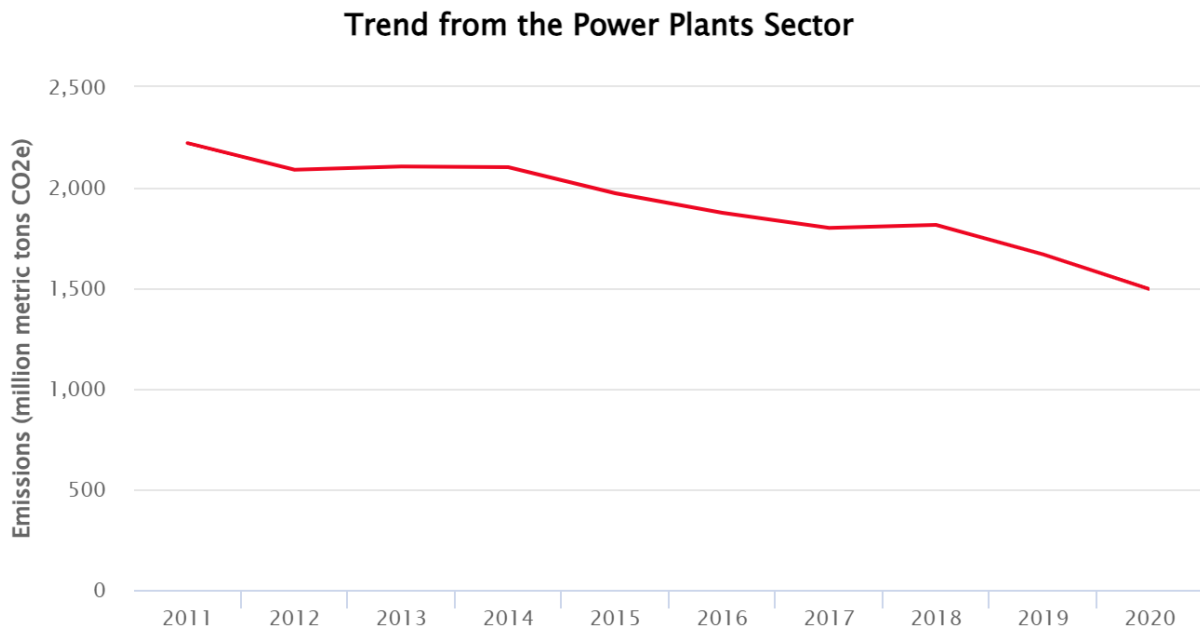


⁶ Numbers at the top of the bars represent the number of reporters in that emissions range.

GHGRP 2020: Power Plants

The power plant sector consists of facilities that produce electricity by combusting fossil fuels and/or biomass. The sector includes units that are subject to the Acid Rain Program and any other electricity generators that are otherwise required to report to the EPA CO₂ mass emissions year-round according to 40 CFR part 75. This sector also includes combustion units serving electricity generators that are located at facilities with primary NAICS codes of 221330 (Steam and Air-Conditioning Supply⁷) or 2211xx (Electric Power Generation, Transmission and Distribution), which includes some part 75 reporters that report heat input to the EPA on a year-round basis. The emissions from this sector are solely from stationary fuel combustion sources.

Trend of Annual Reported GHG Emissions in the Power Plant Sector (as of 8/7/2021)



Click on sectors below to customize sectors displayed in chart

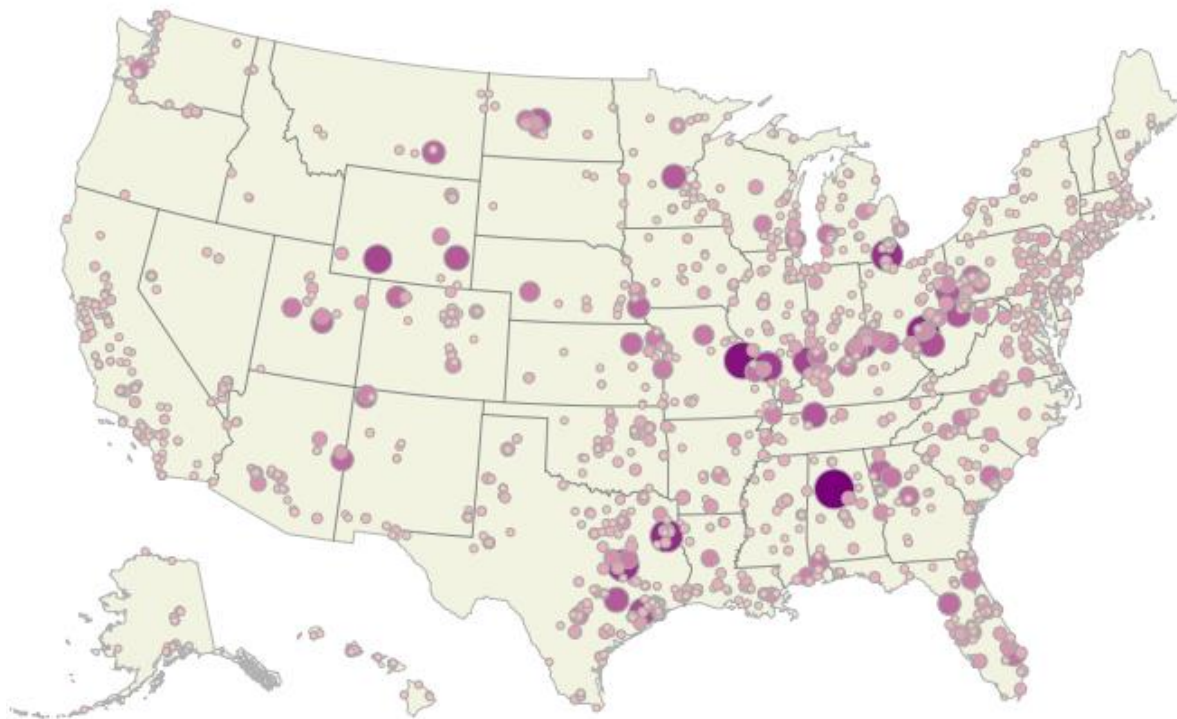
— Power Plants

What factors influenced the [trend in emissions for power plants](#)?

⁷ Establishments primarily engaged in providing steam, heated air, or cooled air. The steam distribution may be through mains.

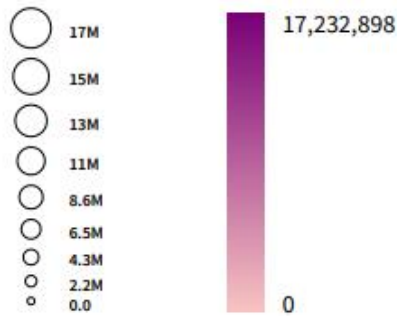
Location and emissions range for each reporting facility in the power plant sector (as of 8/7/2021)

These maps show the locations of direct-emitting facilities. The size of a circle corresponds to the quantity of emissions reported by that facility.



Legend

**GHGRP 2020
Power Plants Sector
Facility Emissions
(metric tons CO₂e)**



Number of reporters and emissions in the power plant sector (as of 8/7/2021)

Power Plants Sector – Greenhouse Gas Emissions Reported to the GHG (all emissions values presented in million metric tons CO ₂ e unless otherwise noted)										
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Number of facilities	1,592	1,609	1,579	1,549	1,487	1,411	1,379	1,391	1,371	1,339
Total emissions (CO₂e)	2,221.7	2,089.5	2,105.7	2,101.7	1,972.3	1,875.1	1,799.4	1,814.8	1,668.6	1,494.9
Emissions by greenhouse gas (CO₂e)										
• Carbon dioxide (CO ₂)	2,208.3	2,077.6	2,093.6	2,089.3	1,961.3	1,865.0	1,789.5	1,805.3	1,660.4	1,488.1
• Methane (CH ₄)	4.2	3.7	3.7	4.0	3.6	3.3	3.2	3.1	2.7	2.3
• Nitrous oxide (N ₂ O)	9.2	8.2	8.4	8.4	7.4	6.8	6.6	6.4	5.5	4.5

Totals may not equal sum of individual GHGs due to independent rounding.

CO₂ emissions from the combustion of biomass are NOT included in emissions totals provided above.

Other EPA Resources

- [U.S. Greenhouse Gas Inventory Report](#)

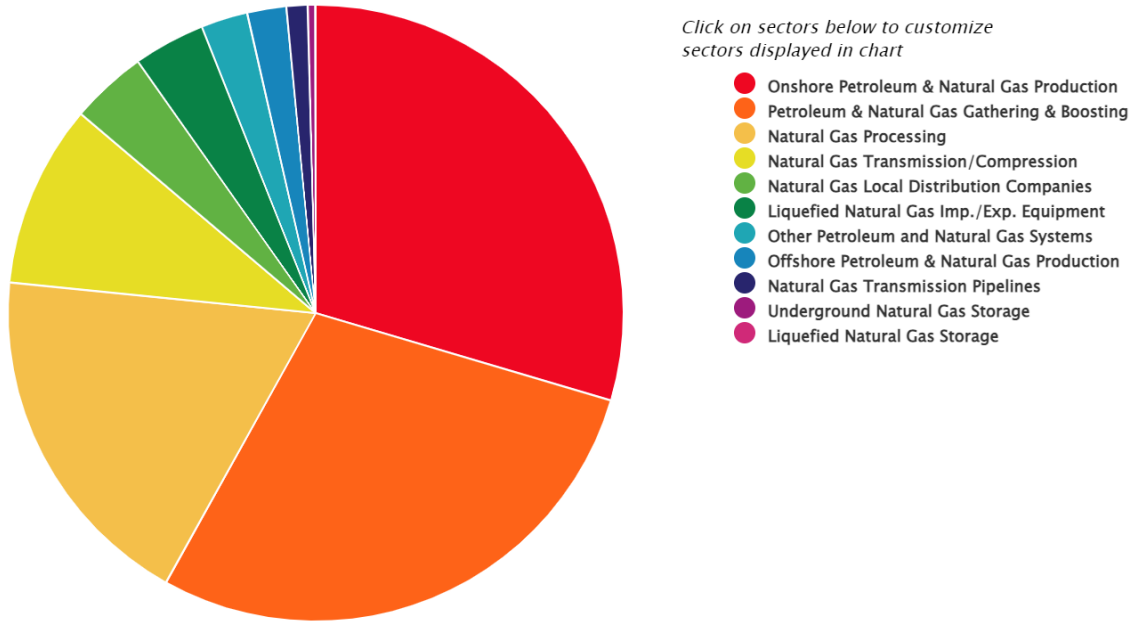
GHGRP 2020: Petroleum & Natural Gas Systems

This sector consists of the following industry segments of the petroleum and natural gas industry.

- **Onshore Production.** Production of petroleum and natural gas associated with onshore production wells and related equipment.
- **Offshore Production.** Production of petroleum and natural gas from offshore production platforms.
- **Gathering and Boosting.** Gathering pipelines and other equipment that collect petroleum/natural gas from onshore production gas or oil wells and then compress, dehydrate, sweeten, or transport the petroleum and/or natural gas.
- **Natural Gas Processing.** Processing of field quality gas to produce pipeline quality natural gas, natural gas, and fractionation of gas liquids.
- **Natural Gas Transmission Compression.** Compressor stations used to transfer natural gas through transmission pipelines.
- **Natural Gas Transmission Pipeline.** A rate-regulated interstate or intrastate pipeline, or a pipeline that falls under the "Hinshaw Exemption" of the Natural Gas Act.
- **Underground Natural Gas Storage.** Facilities that store natural gas in underground formations.
- **Liquefied Natural Gas (LNG) Import/Export.** Liquefied Natural Gas import and export terminals.
- **LNG Storage.** Liquefied Natural Gas storage equipment.
- **Natural Gas Distribution.** Distribution systems that deliver natural gas to customers.
- **Other Petroleum and Natural Gas Systems.** Stationary fuel combustion emissions from petroleum and natural gas source categories that are not otherwise listed.

2020 Total Reported Direct Emissions from the Petroleum and Natural Gas Systems Sector, by Subsector (as of 8/7/2021)

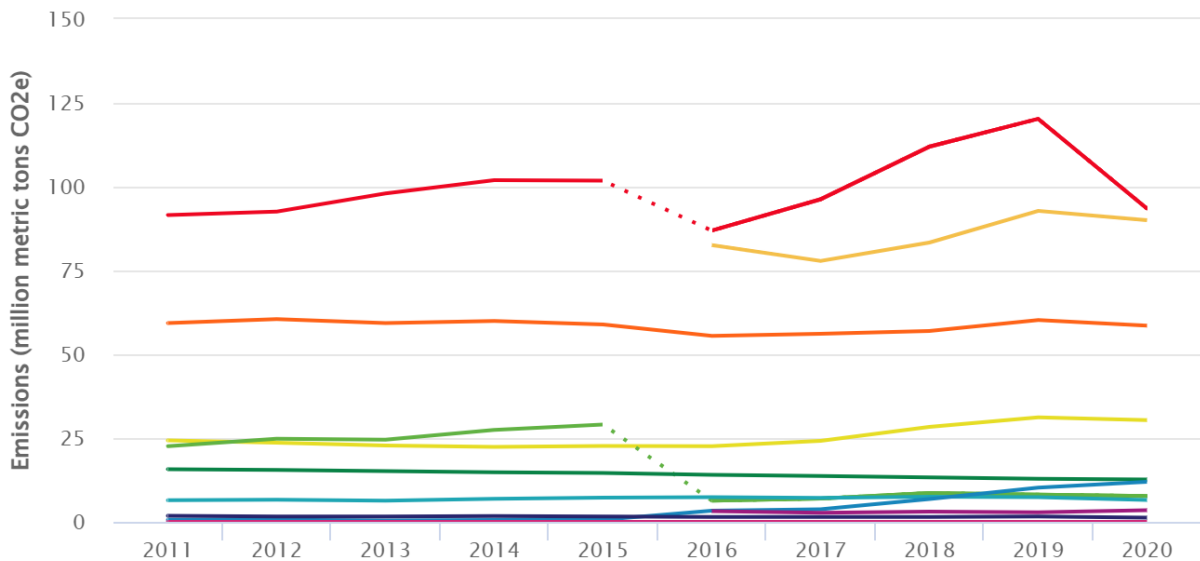
2020 Total Reported Emissions from the Petroleum and Natural Gas Systems Sector, by Subsector



Sum of percentages may not equal 100% due to independent rounding.

Trend of Annual Reported Direct Emissions from the Petroleum and Natural Gas Systems Sector, by Subsector (as of 8/7/2021)

Trend from the Petroleum and Natural Gas Systems Sector, by Subsector



Click on sectors below to customize sectors displayed in chart

- Onshore Petroleum & Natural Gas Production
- Natural Gas Processing
- Petroleum & Natural Gas Gathering & Boosting
- Natural Gas Transmission/Compression
- Other Petroleum and Natural Gas Systems
- Natural Gas Local Distribution Companies
- Offshore Petroleum & Natural Gas Production
- Liquefied Natural Gas Imp./Exp. Equipment
- Underground Natural Gas Storage
- Natural Gas Transmission Pipelines
- Liquefied Natural Gas Storage

- (1) Beginning in Reporting Year 2016, Onshore Production facilities began reporting emissions from oil well completions and workovers with hydraulic fracturing.
- (2) This industry segment began reporting data for the first time in Reporting Year 2016
- (3) Beginning in Reporting Year 2016, facilities that met the definition of Gathering and Boosting reported emissions for applicable sources. This includes certain stationary and portable fuel combustion equipment emissions that may have been published for Reporting Years 2011-2015 as Other Petroleum and Natural Gas Systems.

Number of Reporters and Emissions in the Petroleum and Natural Gas Systems Sector (as of 8/7/2021)

Petroleum and Natural Gas Systems Sector — Greenhouse Gas Emissions Reported to the GHGRP										
<i>(all emissions values presented in million metric tons CO2e)</i>										
	2011	2012	2013	2014	2015	2016 ⁸	2017	2018	2019	2020
Number of facilities	1,921	2,096	2,187	2,419	2,422	2,251	2,258	2,327	2,381	2,377
Total emissions (CO2e)	222.3	225.7	228.0	235.7	236.4	283.2	290.2	321.2	347.4	316.0
Emissions by greenhouse gas (CO2e)										

⁸ Facilities in the Gathering and Boosting and Transmission Pipeline industry segments began reporting in 2016.

• Carbon dioxide (CO ₂)	138.4	145.5	150.7	162.4	164.8	186.8	199.5	228.9	256.2	234.0
• Methane (CH ₄)	83.7	80.1	77.1	73.2	71.5	96.3	90.5	92.2	91.0	81.8
• Nitrous oxide (N ₂ O)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2

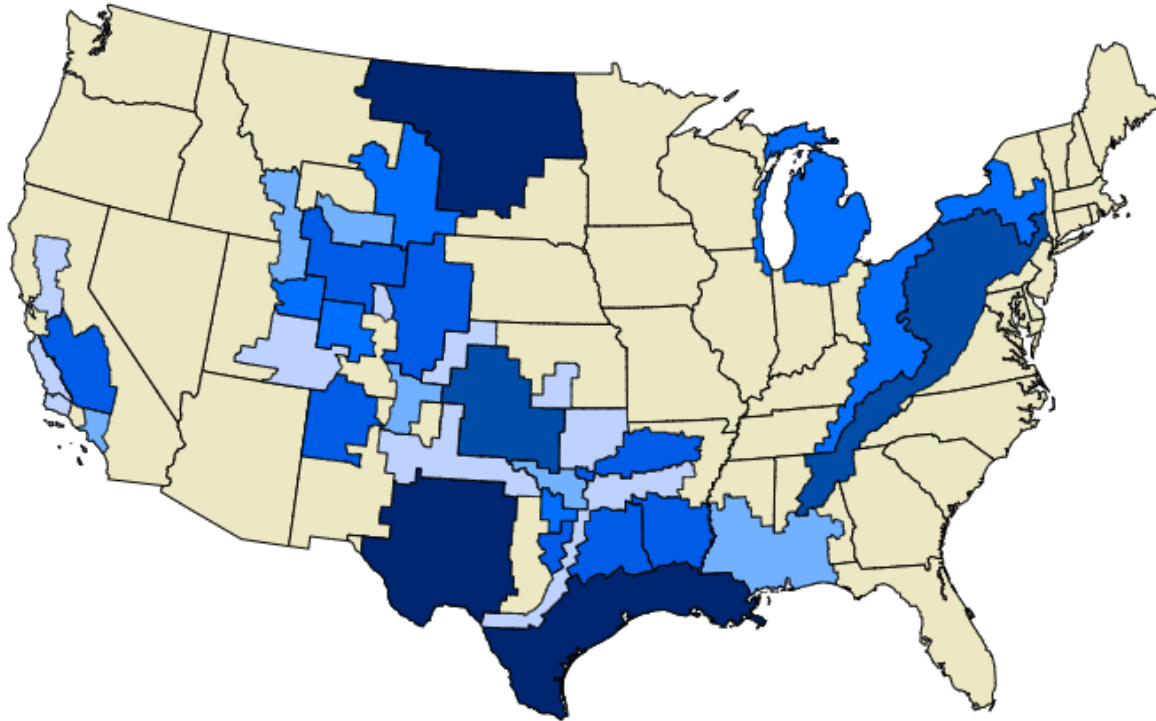
Totals may not equal sum of individual GHGs due to independent rounding.

CO₂ emissions from the combustion of biomass are NOT included in emissions totals provided above.

Number of reporters and 2020 emissions (CO₂e) per petroleum and natural gas systems industry subsector		
Industry Sector	2020 Number of Reporters	2020 Emissions (million metric tons CO₂e)
Onshore Production	468	93.5
Offshore Production	134	6.5
Gathering and Boosting	361	90.0
Natural Gas Processing	462	58.5
Natural Gas Transmission Compression	640	30.3
Natural Gas Transmission Pipelines	49	3.5
Underground Natural Gas Storage	52	1.3
Liquefied Natural Gas Import/Export	11	11.9
Liquefied Natural Gas Storage	5	**
Natural Gas Distribution	164	12.6

Totals may not equal sum of individual GHGs due to independent rounding.

Emissions by Basin Onshore Petroleum and Natural Gas Onshore Production (metric tons CO₂e)



**GHGRP 2020
Emissions by Basin*
Petroleum and Natural Gas Systems
Onshore Production
(metric tons CO₂e)**

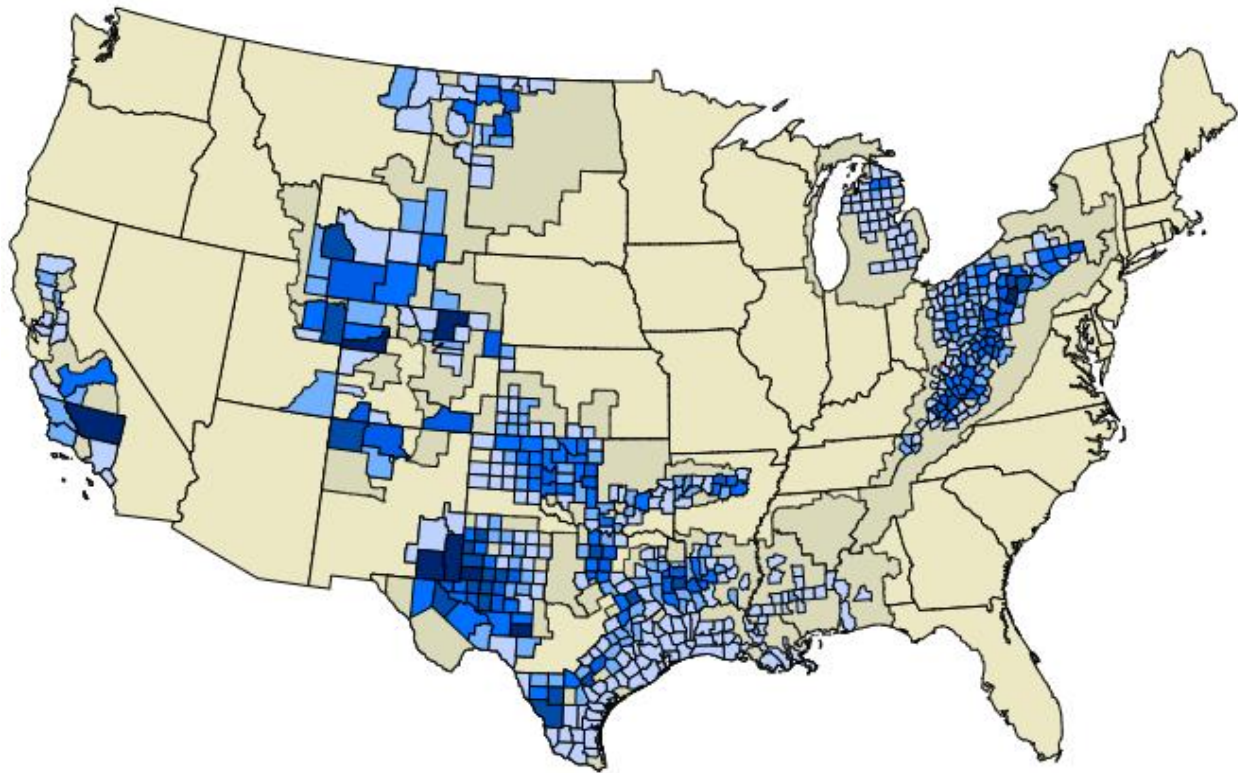
* Basin refers to the geologic provinces as published by the American Association of Petroleum Geologists

Data Source: 2020 GHGRP as of 8/7/21

Legend (metric tons CO₂e)

- < 150,000
- 150,000 - 500,000
- 500,000 - 1,500,000
- 1,500,000 - 5,000,000
- 5,000,000 - 10,000,000
- > 10,000,000

Well Count by County Onshore Petroleum and Natural Gas Production (wells)



GHGRP 2020
Well Count by County
Onshore Petroleum and
Natural Gas Production
(wells)

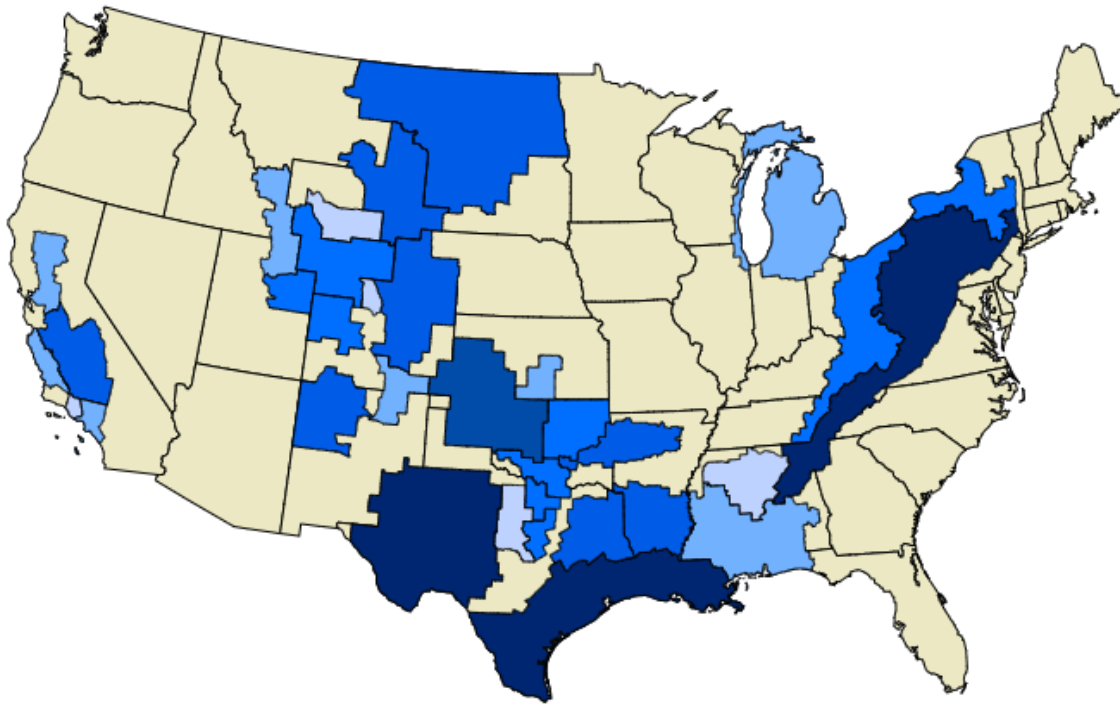
Data Source: 2020 GHGRP as of 8/7/21

[Export Visualization](#)

Legend (wells)

- < 50
- 51 - 200
- 201 - 500
- 501 - 1,000
- 1,001 - 2,000
- > 2,000

Reporting emissions (CO₂e) by geologic basin for gathering and boosting facilities



**GHGRP 2020
Emissions by Basin*
Petroleum and Natural Gas Systems
Gathering and Boosting
(metric tons CO₂e)**

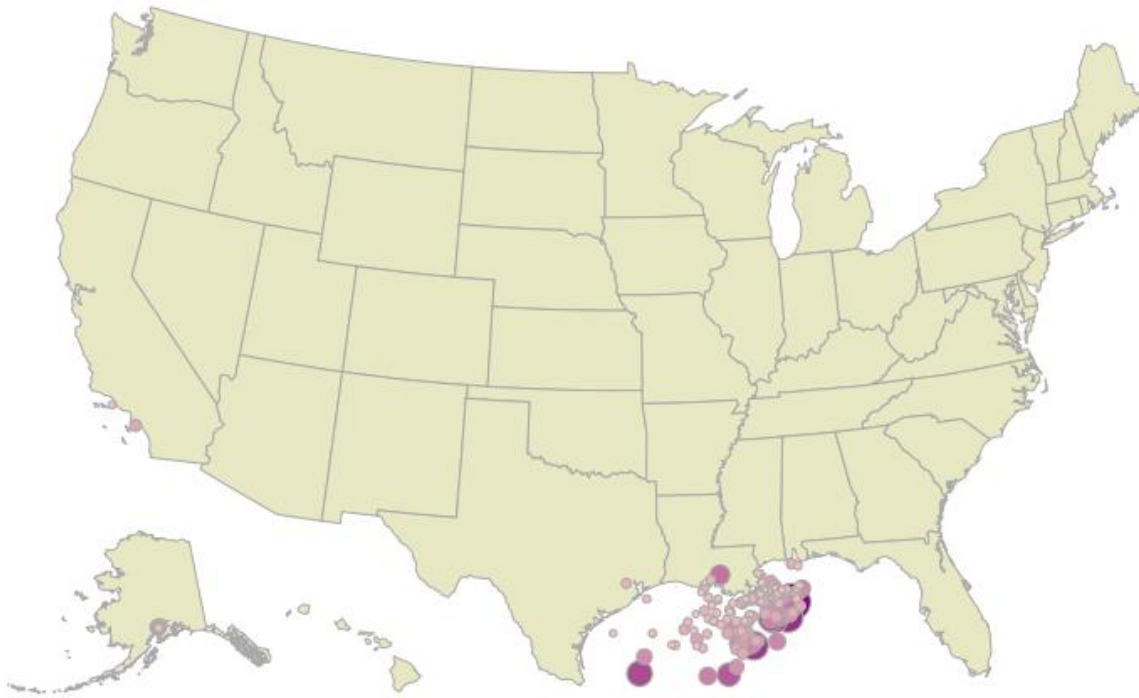
* Basin refers to the geologic provinces as published by the American Association of Petroleum Geologists

Data Source: 2020 GHGRP as of 8/7/21

Legend (metric tons CO₂e)

- < 150,000
- 150,000 - 500,000
- 500,000 - 1,500,000
- 1,500,000 - 5,000,000
- 5,000,000 - 10,000,000
- > 10,000,000

Facility locations and reported emissions (CO₂e) for offshore production



Legend

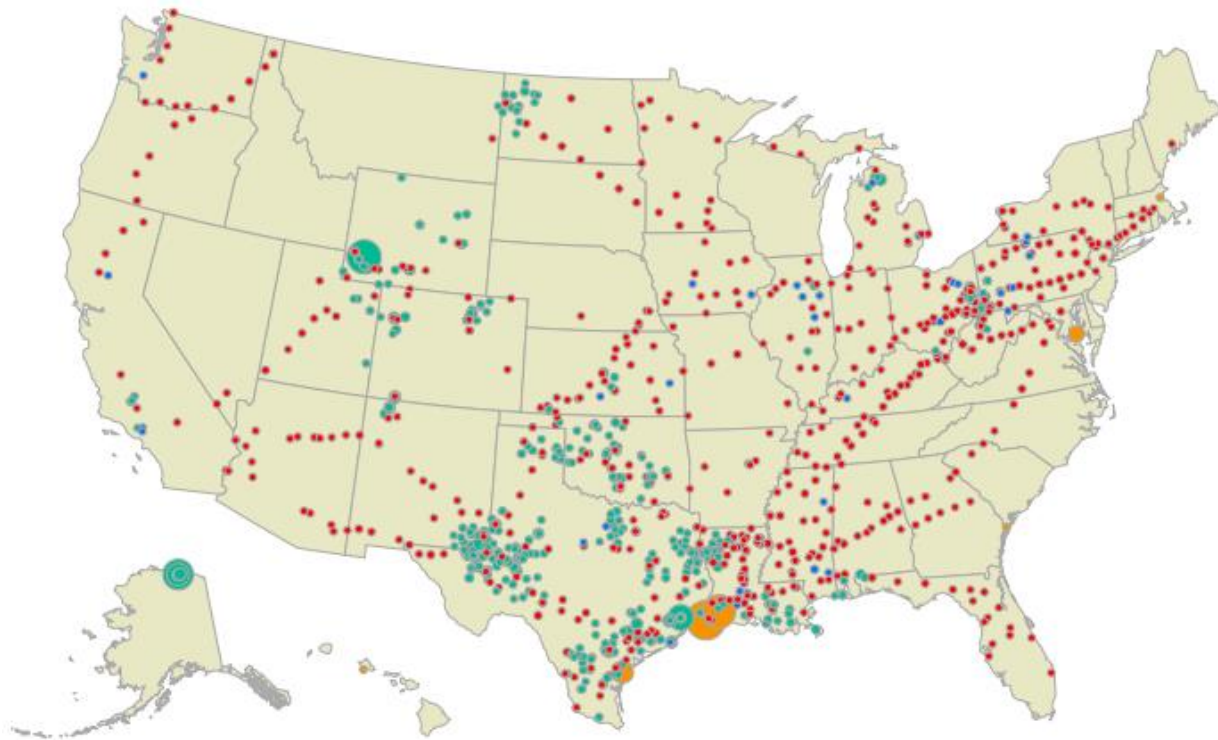
**GHGRP 2020
Offshore Production
(metric tons CO₂e)**
Data Source: 2020 GHGRP as of 8/7/21

[Export Visualization](#)

- 320k
- 270k
- 230k
- 180k
- 140k
- 91k
- 46k
- 720



Reported emissions (CO₂e) and facility locations for industry types: natural gas processing, natural gas transmission, underground natural gas storage, LNG storage, LNG import/export

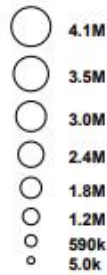


**GHGRP 2020
Facility Locations and
Emissions
(metric tons CO₂e)**

Data Source: 2020 GHGRP as of 8/7/21

[Export Visualization](#)

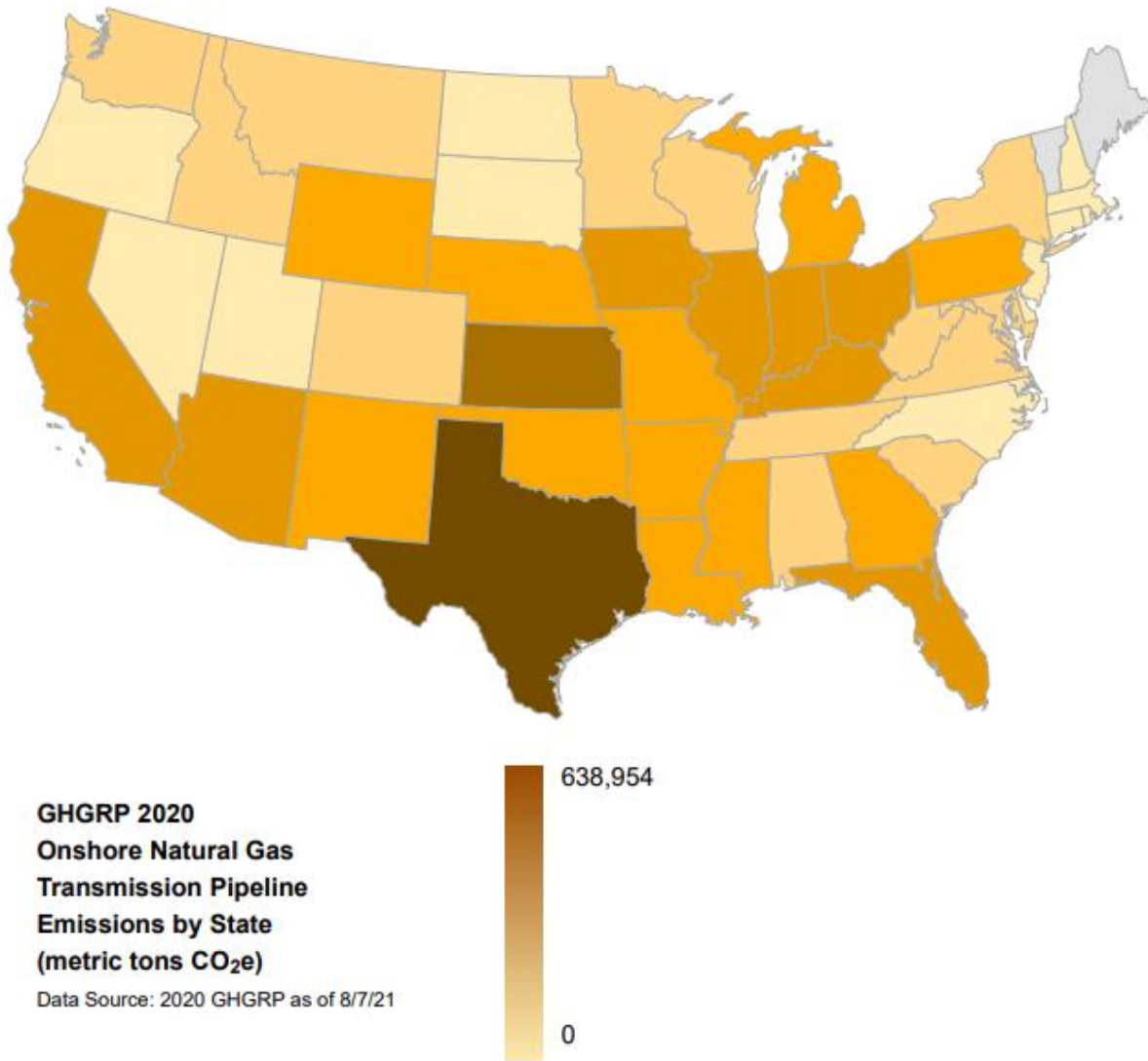
Size Legend



Industry Segment



Reported emissions (CO₂e) by state for onshore gas transmission pipelines



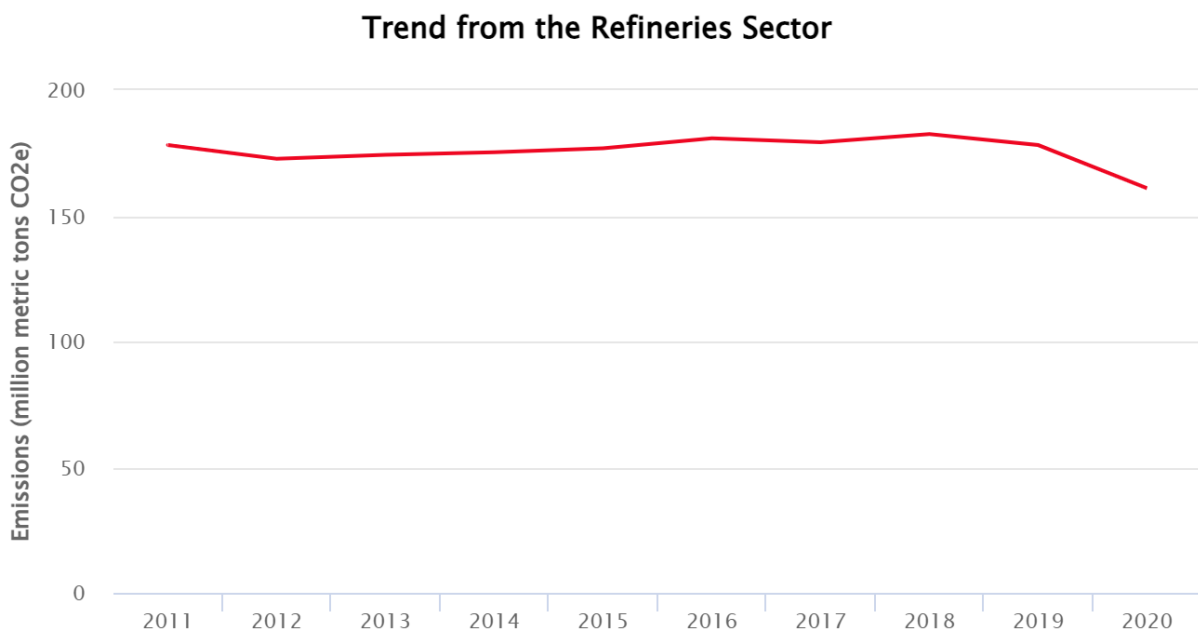
Other EPA Resources

- [U.S. Greenhouse Gas Inventory Report](#)
- [GHGRP Subpart W - Petroleum and Natural Gas Systems](#)

GHGRP 2020: Refineries

The refinery sector consists of facilities that produce gasoline, gasoline blending stocks, naphtha, kerosene, distillate fuel oils, residual fuel oils, lubricants, or asphalt (bitumen) by the distillation of petroleum or the re-distillation, cracking, or reforming of unfinished petroleum derivatives. GHG process emissions from this sector include emissions from venting, flares, and fugitive leaks from equipment (e.g., valves, flanges, pumps). In addition to emissions from petroleum refining processes, the sector includes combustion emissions from stationary combustion units located at these facilities. Process emissions from hydrogen production plants and petrochemical manufacturing facilities located at refineries are included in the chemical manufacturing sector. Emissions from industrial waste landfills and industrial wastewater treatment at these facilities are included in the waste sector.

Trend of Annual Reported GHG Emissions in the Refinery Sector (as of 8/7/2021)



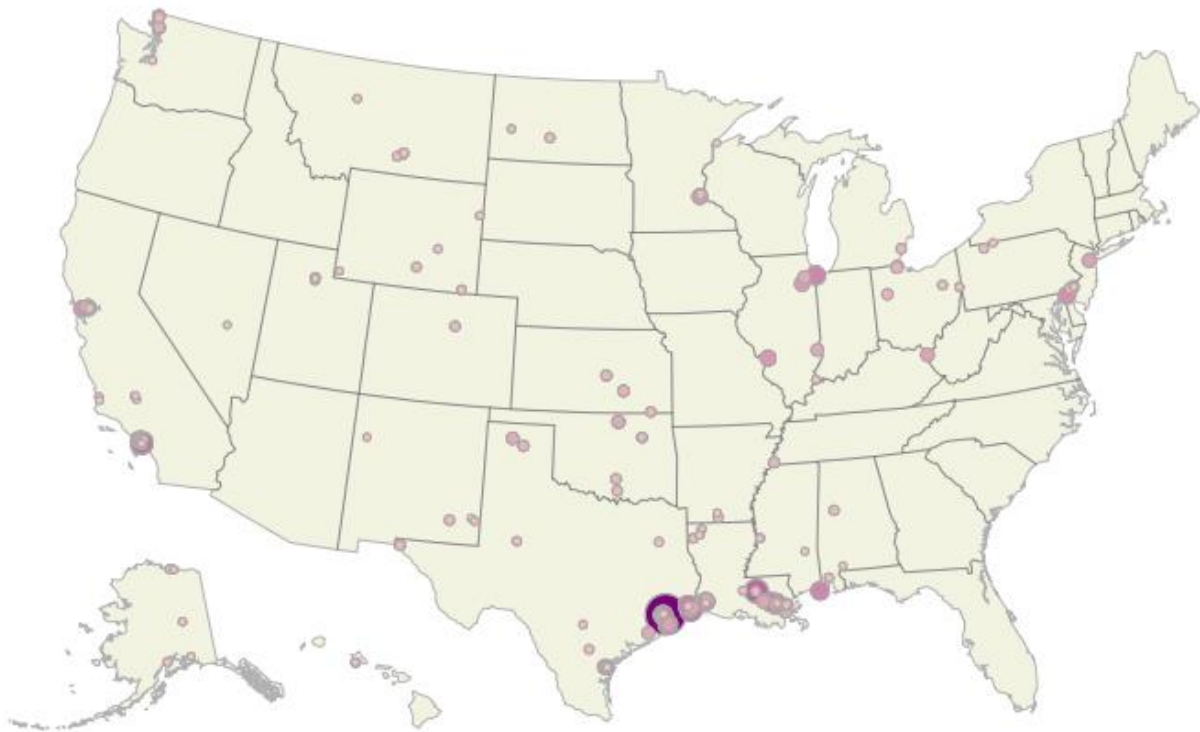
Click on sectors below to customize sectors displayed in chart

— Petroleum Refineries

What factors influenced the [trend in emissions for refineries?](#)

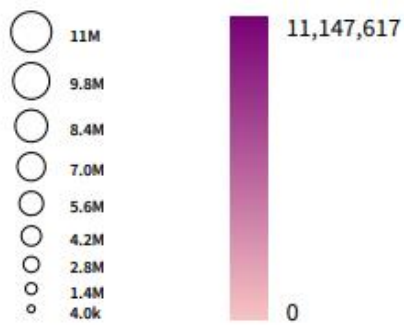
Location and emissions range for each reporting facility in the refinery sector (as of 8/7/2021)

These maps show the locations of direct-emitting facilities. The size of a circle corresponds to the quantity of emissions reported by that facility.



Legend

**GHGRP 2020
Refineries Sector
Facility Emissions
(metric tons CO₂e)**



Number of reporters and emissions in the refinery sector (as of 8/7/2021)

Refineries Sector — Greenhouse Gas Emissions Reported to the GHGRP (all emissions values presented in million metric tons CO ₂ e)										
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Number of facilities	150	147	146	142	144	144	144	141	139	140
Total emissions (CO₂e)	178.2	172.6	174.3	175.3	176.9	180.9	179.2	182.5	178.1	160.9
Emissions by greenhouse gas (CO₂e)										
• Carbon dioxide (CO ₂)	176.8	171.3	173.0	174.0	175.5	179.5	177.9	181.1	176.7	159.7
• Methane (CH ₄)	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.9	0.8
• Nitrous oxide (N ₂ O)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5

Totals may not equal sum of individual GHGs due to independent rounding.

CO₂ emissions from the combustion of biomass are NOT included in emissions totals provided above.

Other EPA Resources

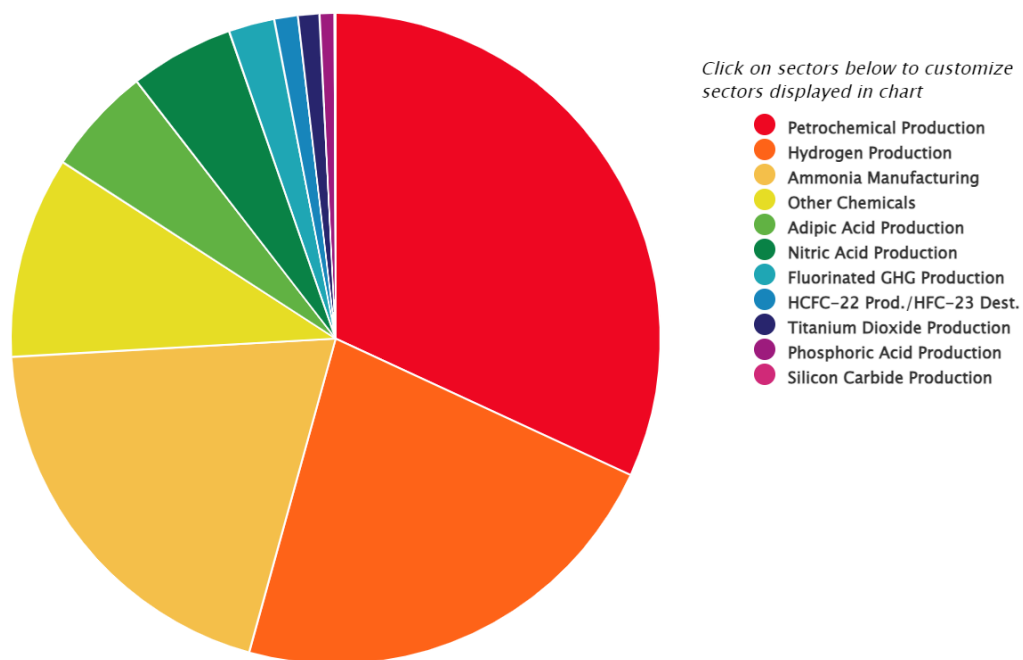
- [U.S. Greenhouse Gas Inventory Report](#)

GHGRP 2020: Chemicals

The chemical manufacturing sector consists of facilities that manufacture organic or inorganic chemicals. For this summary, the sector is broken down into facilities that produce fluorinated chemicals and non-fluorinated chemicals. The non-fluorinated chemicals subsector comprises facilities that produce adipic acid, ammonia, hydrogen (both merchant and non-merchant plants), nitric acid, petrochemicals, phosphoric acid, silicon carbide, titanium dioxide and other non-fluorinated chemicals. The fluorinated chemicals subsector comprises facilities that produce HCFC-22 (or destroy HFC-23) and other fluorinated chemicals. A more detailed description of these subsectors is provided below. A total of 453 chemicals facilities reported in 2020.

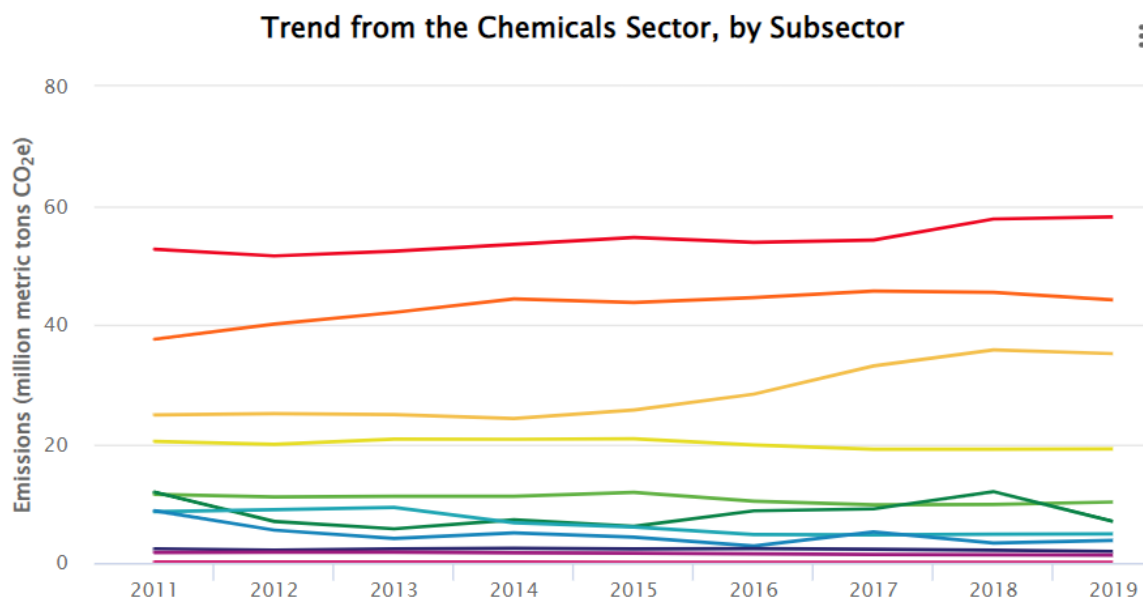
2020 Total Reported Direct Emissions from Chemicals, by Subsector (as of 8/7/2021).

2020 Total Reported Emissions from the Chemicals Sector, by Subsector



Sum of percentages may not equal 100% due to independent rounding.

Trend of Annual Reported GHG Emissions for Chemicals, by Subsector (as of 8/7/2021).



Click on sectors below to customize sectors displayed in chart



What factors influenced the [trends in emissions for non-fluorinated chemicals production?](#)

What factors influenced the [trend in emissions for fluorinated chemicals production?](#)

Number of reporters and emissions for Chemicals (All Subsectors) (as of 8/7/2021)

Chemicals Sector — Greenhouse Gas Emissions Reported to the GHGRP

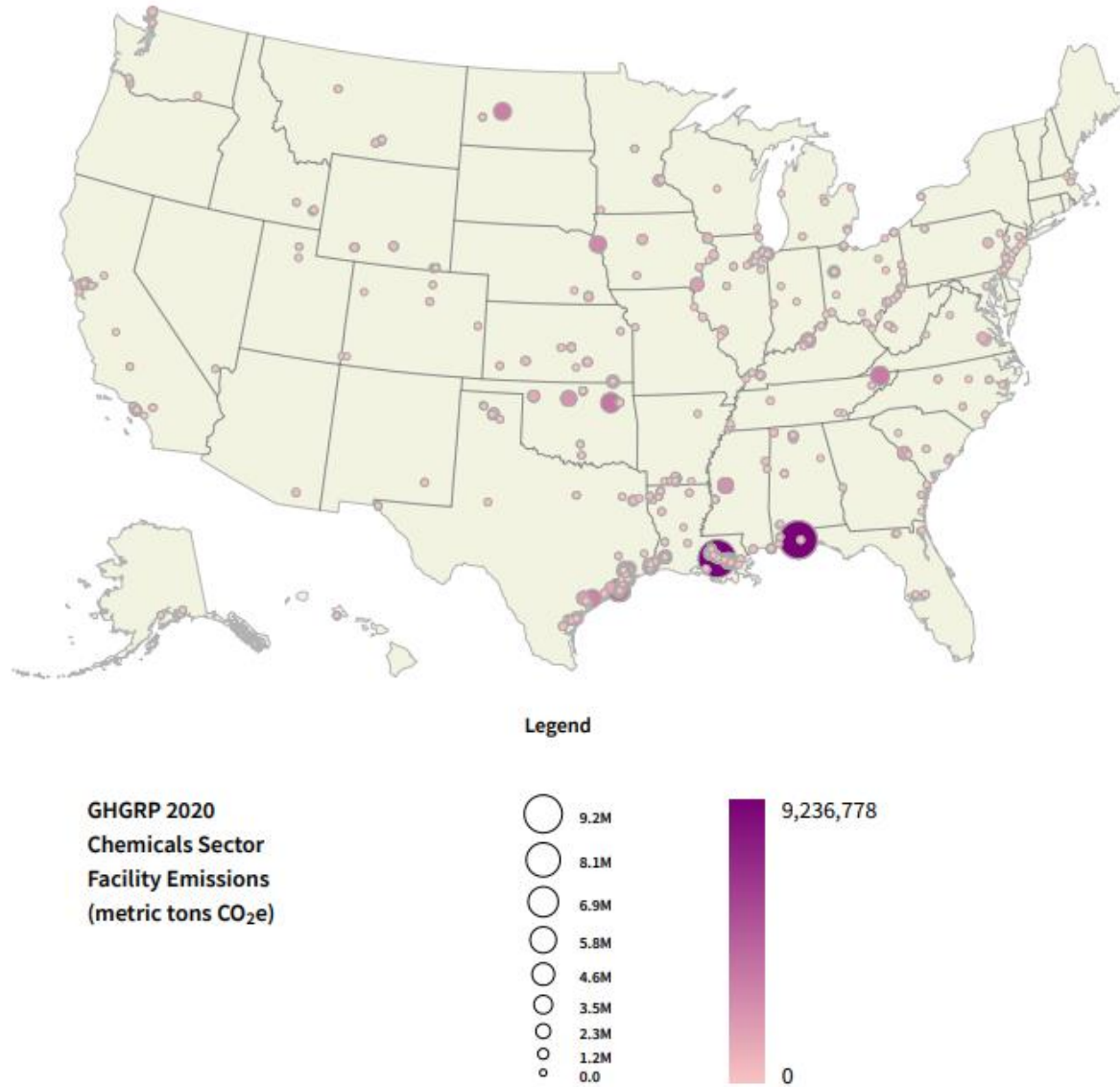
(all emissions values presented in million metric tons CO₂e)

Chemicals Sector — Greenhouse Gas Emissions Reported to the GHGRP										
(all emissions values presented in million metric tons CO ₂ e)										
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Number of facilities:	458	468	473	464	465	456	458	457	454	453
Total emissions (CO₂e):	180.4	173.0	174.6	177.1	177.1	177.2	184.5	191.3	185.9	184.1
Emissions by greenhouse gas (CO₂e)										
• Carbon dioxide (CO ₂):	142.5	143.2	147.0	149.4	151.3	152.7	157.9	163.4	161.9	160.4
• Methane (CH ₄):	0.2	0.2	0.2	0.3	0.2	0.2	0.3	0.3	0.3	0.3
• Nitrous oxide (N ₂ O):	21.3	16.0	14.8	16.6	16.0	17.4	17.2	20.3	15.4	17.8
• Fluorinated GHGs:	16.5	13.6	12.6	10.9	9.5	6.8	9.2	7.4	8.3	5.7
Emissions by subsector										
• Non-fluorinated chemicals	163.1	158.6	161.2	165.4	166.8	169.6	174.6	183.2	176.8	177.7
• Fluorinated chemicals	17.3	14.4	13.4	11.7	10.3	7.6	9.9	8.1	9.1	6.4

Totals may not equal sum of individual GHGs due to independent rounding.

Location and emissions range for each reporting facility for Chemicals (All Subsectors) (as of 8/7/2021)

These maps show the locations of direct-emitting facilities. The size of a circle corresponds to the quantity of emissions reported by that facility.



Other EPA Resources

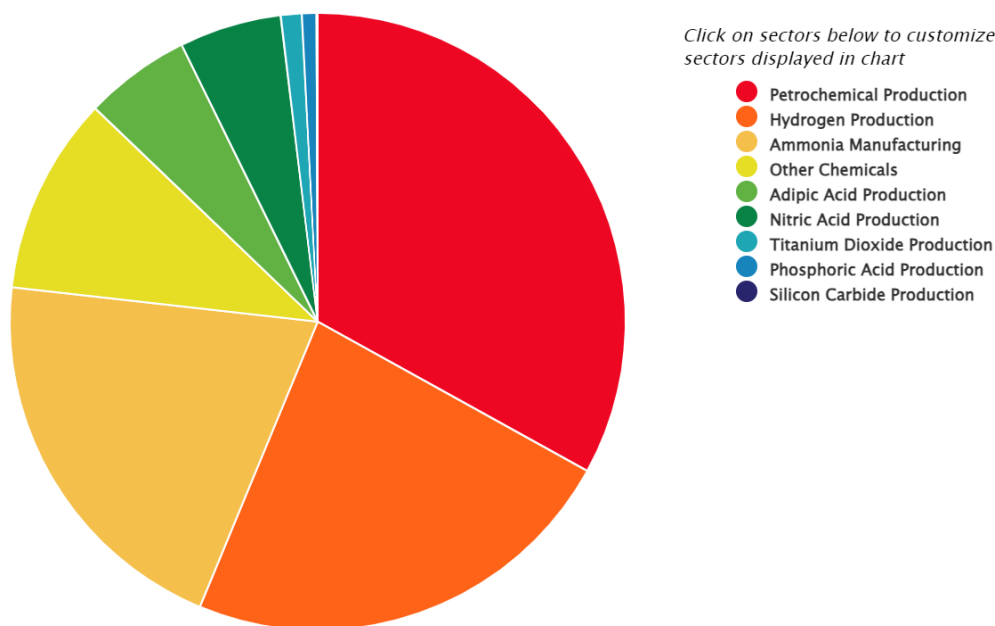
- [U.S. Greenhouse Gas Inventory Report](#)

Non-Fluorinated Chemicals

The non-fluorinated chemical manufacturing subsector consists of facilities that produce adipic acid, ammonia, hydrogen (both merchant and non-merchant plants), nitric acid, petrochemicals (acrylonitrile, carbon black, ethylene, ethylene dichloride, ethylene oxide, methanol), phosphoric acid, silicon carbide, soda ash, and titanium dioxide and other non-fluorinated chemicals. In addition to emissions from these chemical production processes, the subsector includes combustion emissions from facilities that produce pesticides, fertilizer, pharmaceuticals, and other organic and inorganic chemicals. A total of 436 facilities reported 2020 emissions under the non-fluorinated chemicals subsector. A small number of facilities in this subsector collect CO₂ either for use in their other production processes, to transfer to other users, or to sequester or otherwise inject underground; this subsector includes the CO₂ from those process emissions. For example, some of the process emissions reported for ammonia manufacturing plants includes CO₂ that is later consumed on site for urea production. This CO₂ is not released to the ambient air from the ammonia manufacturing process unit(s).

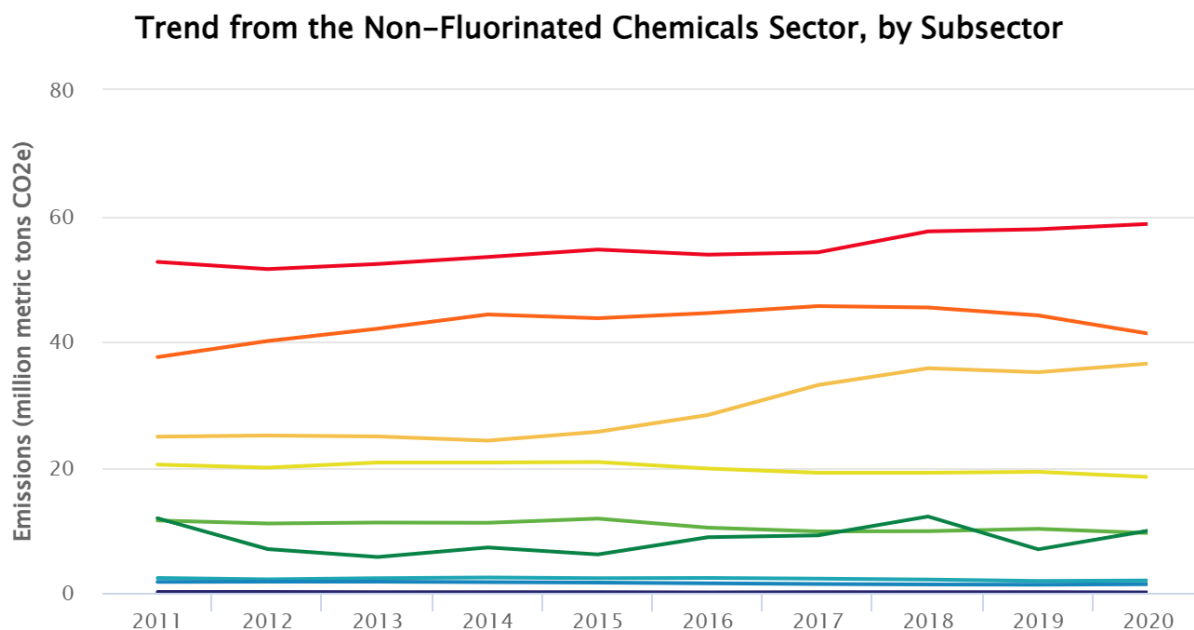
2020 Total Reported Direct Emissions from Chemicals (Non-fluorinated), by Subsector (as of 8/7/2021).

2020 Total Reported Emissions from the Non-Fluorinated Chemicals Sector, by Subsector



Sum of percentages may not equal 100% due to independent rounding.

Trend of Annual Reported GHG Emissions for Non-Fluorinated Chemicals, by Subsector (as of 8/7/2021).



Click on sectors below to customize sectors displayed in chart

- Petrochemical Production
- Hydrogen Production
- Ammonia Manufacturing
- Other Chemicals
- Nitric Acid Production
- Adipic Acid Production
- Titanium Dioxide Production
- Phosphoric Acid Production
- Silicon Carbide Production

Number of Reporters and Emissions in the Non-Fluorinated Chemicals Sector (as of 8/7/2021)

Non-Fluorinated Chemicals Sector — Greenhouse Gas Emissions Reported to the GHGRP (all emissions values presented in million metric tons CO ₂ e)										
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Number of facilities	442	452	457	449	450	441	443	441	437	436
Total emissions (CO₂e)	163.1	158.6	161.2	165.4	166.8	169.6	174.6	183.2	176.8	177.7
Emissions by greenhouse gas (CO₂e)										
• Carbon dioxide (CO ₂)	141.6	142.4	146.2	148.6	150.6	152.0	157.2	162.6	161.1	159.6
• Methane (CH ₄)	0.2	0.2	0.2	0.3	0.2	0.2	0.3	0.3	0.3	0.3
• Nitrous oxide (N ₂ O)	21.3	16.0	14.8	16.6	16.0	17.4	17.2	20.3	15.4	17.8

Totals may not equal sum of individual GHGs due to independent rounding.

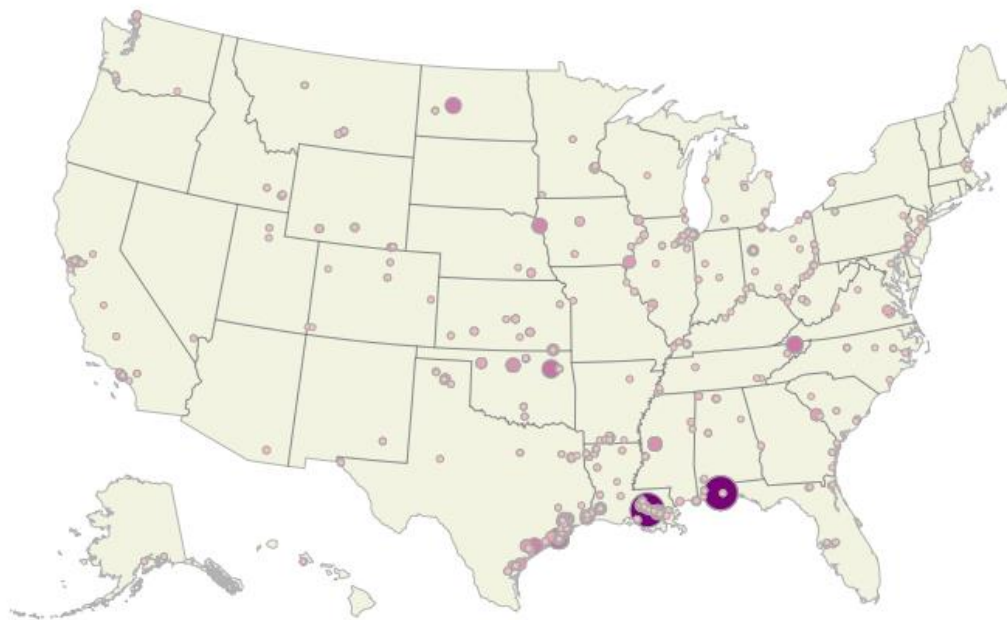
CO₂ emissions from the combustion of biomass are NOT included in emissions totals provided above.

Number of reporters and 2020 emissions (CO₂e) per non-fluorinated chemicals industry subsector

Industry Sector	2020 Number of Reporters	2020 Emissions (million metric tons CO ₂ e)
Adipic Acid Production	2	9.9
Ammonia Manufacturing	29	36.5
Hydrogen Production	114	41.3
Nitric Acid Production	32	9.5
Petrochemical Production	72	58.7
Phosphoric Acid Production	9	1.4
Silicon Carbide Production	1	0.1
Titanium Dioxide Production	6	2.0

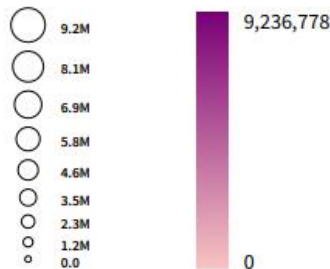
Location and emissions range for each reporting facility for Chemicals (Non-fluorinated) (as of 8/7/2021).

These maps show the locations of direct-emitting facilities. The size of a circle corresponds to the quantity of emissions reported by that facility.



Legend

**GHGRP 2020
Chemicals (Non-Fluorinated)
Sector
Facility Emissions
(metric tons CO₂e)**

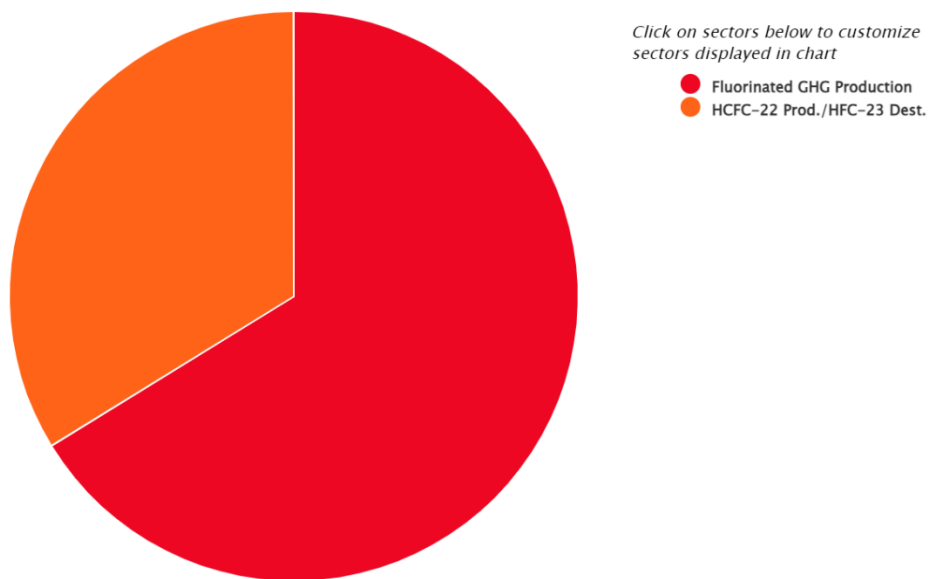


Fluorinated Chemicals

The fluorinated chemical subsector includes facilities that produce hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF₆), nitrogen trifluoride (NF₃), other fluorinated GHGs such as fluorinated ethers, and chlorofluorocarbons (CFCs) and hydrochlorofluorocarbons (HCFCs), including chlorodifluoromethane (HCFC-22). The subsector also includes facilities that destroy HFC-23, which is a by-product of HCFC-22 production and which may be emitted from the destruction process. This subsector does not include industries that use these fluorinated GHGs (i.e. semiconductors).

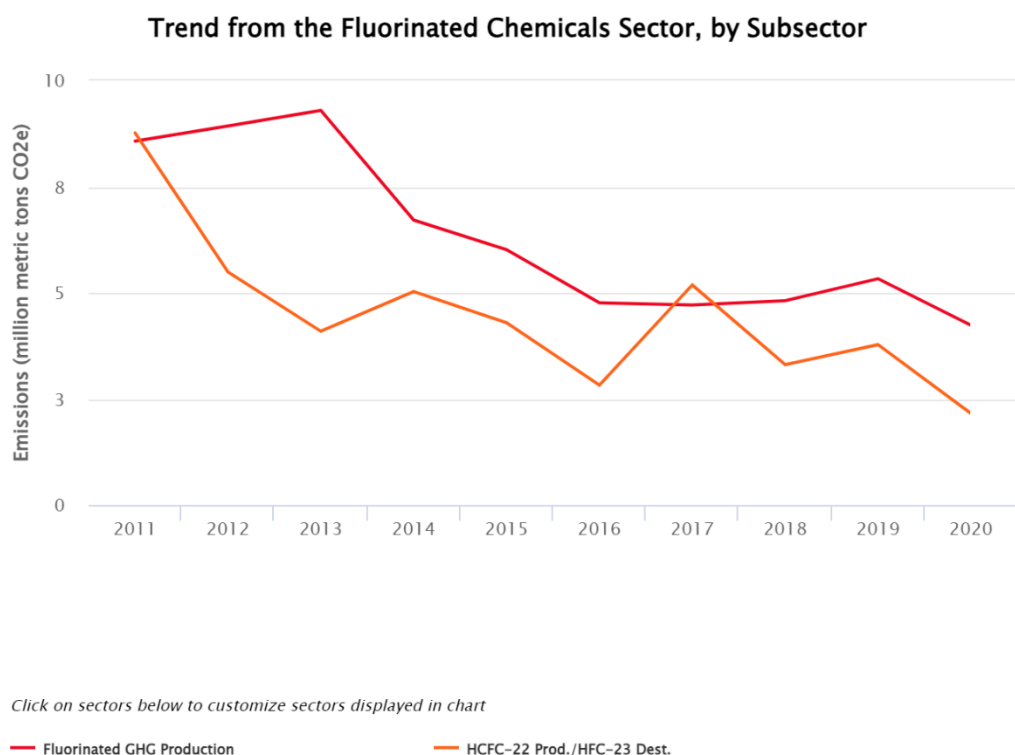
2020 Total Reported Direct Emissions from Fluorinated Chemicals, by Subsector (as of 8/7/2021).

2020 Total Reported Emissions from the Fluorinated Chemicals Sector, by Subsector



Sum of percentages may not equal 100% due to independent rounding.

Trend of Annual Reported GHG Emissions from Fluorinated Chemicals, by Subsector (as of 8/7/2021).



Number of Reporters and Emissions in the Fluorinated Chemicals Sector (as of 8/7/2021)

Fluorinated Chemicals Subsector — Greenhouse Gas Emissions Reported to the GHGRP (all emissions values presented in million metric tons CO ₂ e)										
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Number of facilities	16	16	16	15	15	15	15	16	17	17
Total emissions (CO₂e)	17.3	14.4	13.4	11.7	10.3	7.6	9.9	8.1	9.1	6.4
Emissions by greenhouse gas (CO₂e)										
Carbon dioxide (CO ₂)	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.8	0.7
• Methane (CH ₄)	**	**	**	**	**	**	**	**	**	**
• Nitrous oxide (N ₂ O)	**	**	**	**	**	**	**	**	**	**
• Fluorinated GHGs	16.5	13.6	12.6	10.9	9.5	6.8	9.2	7.4	8.3	5.7

Totals may not equal sum of individual GHGs due to independent rounding.

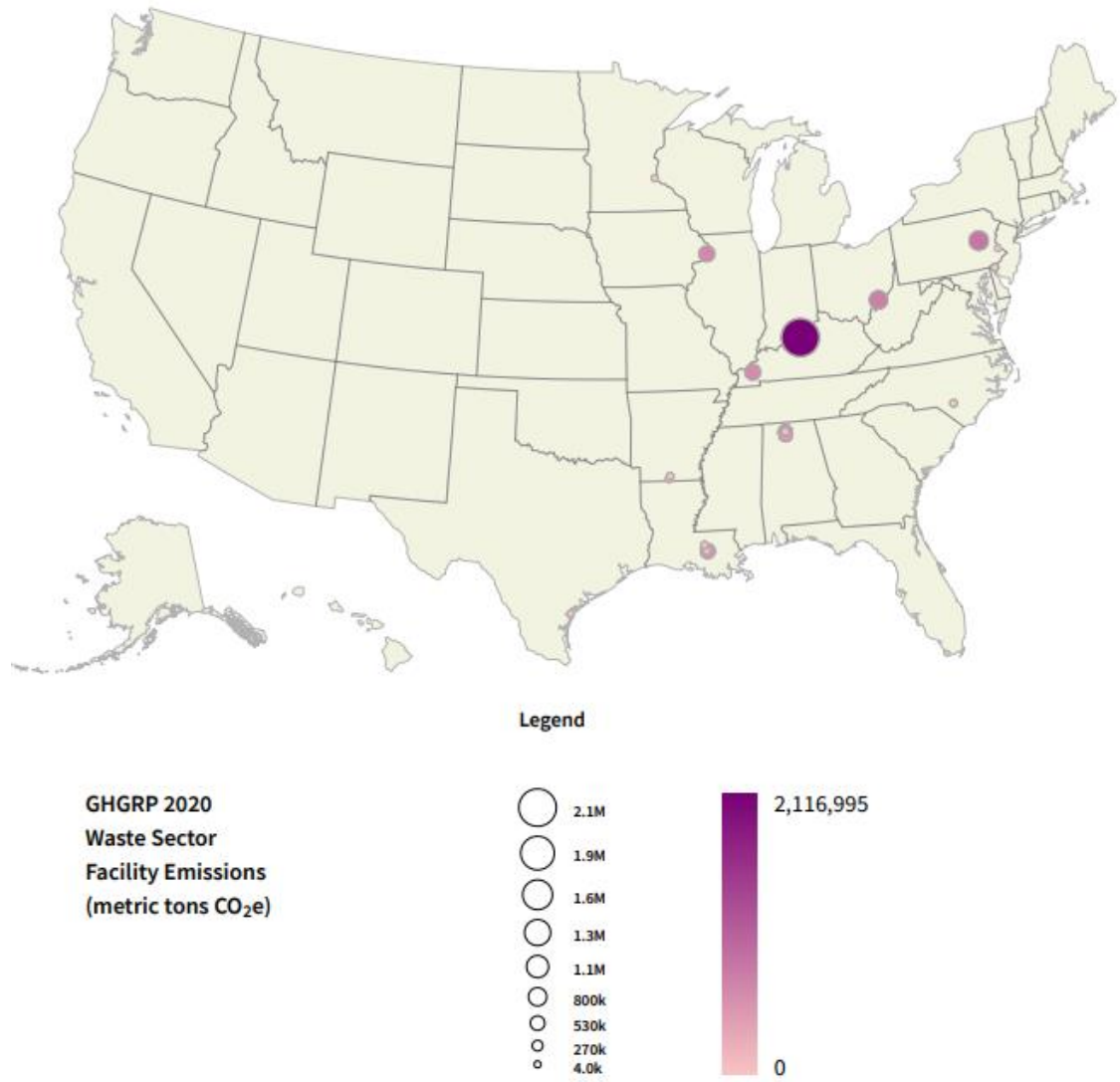
** Total reported emissions are less than 0.05 million metric tons CO₂e.

Number of reporters and 2020 emissions (CO₂e) per fluorinated chemicals industry subsector		
Industry Sector	2020 Number of Reporters	2020 Emissions (million metric tons CO ₂ e)
Fluorinated GHG Production	15	4.2
HCFC-22 Production/HFC-23 Destruction	5	2.2

Totals may not equal sum of individual GHGs due to independent rounding.

Location and emissions range for each reporting facility in Fluorinated Chemicals (as of 8/7/2021).

This map shows the locations of direct-emitting facilities. The size of a circle corresponds to the quantity of emissions reported by that facility.



Other EPA Resources

- [U.S. Greenhouse Gas Inventory Report](#)

GHGRP 2020: Waste

The waste sector consists of municipal solid waste (MSW) landfills, industrial waste landfills, industrial wastewater treatment systems, and facilities that operate combustors or incinerators for the disposal of nonhazardous solid waste. Emissions from fossil fuel combustion at facilities with industrial waste landfills, and industrial wastewater treatment systems are included in other sectors.

MSW landfills. This category consists of landfills that accepted MSW on or after January 1, 1980 and generate methane in amounts equivalent to 25,000 metric tons of CO₂e or more per year. This category includes emissions from the landfill, landfill gas collection systems, and destruction devices for landfill gases (including boilers, engines, and flares).

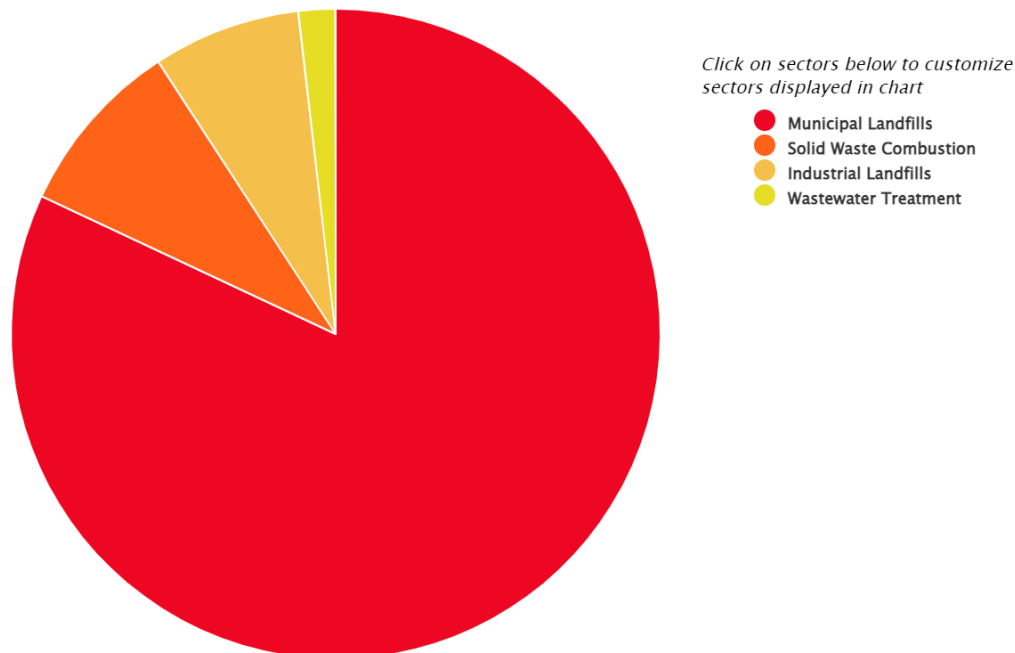
Industrial Waste Landfills. This category consists of industrial waste landfills that accepted industrial waste on or after January 1, 1980 and that have a total landfill design capacity of 300,000 metric tons or more. The category excludes landfills for hazardous waste and those that receive only construction and demolition or inert wastes. This category includes emissions from the landfill, landfill gas collection systems, and destruction devices for landfill gases (including flares).

Industrial Wastewater Treatment. This category consists of anaerobic processes used to treat nonhazardous industrial wastewater and industrial wastewater treatment sludge at facilities that perform pulp and paper manufacturing, food processing, ethanol production, or petroleum refining.

Solid Waste Combustion. This category consists of combustors and incinerators for the disposal of nonhazardous solid waste.

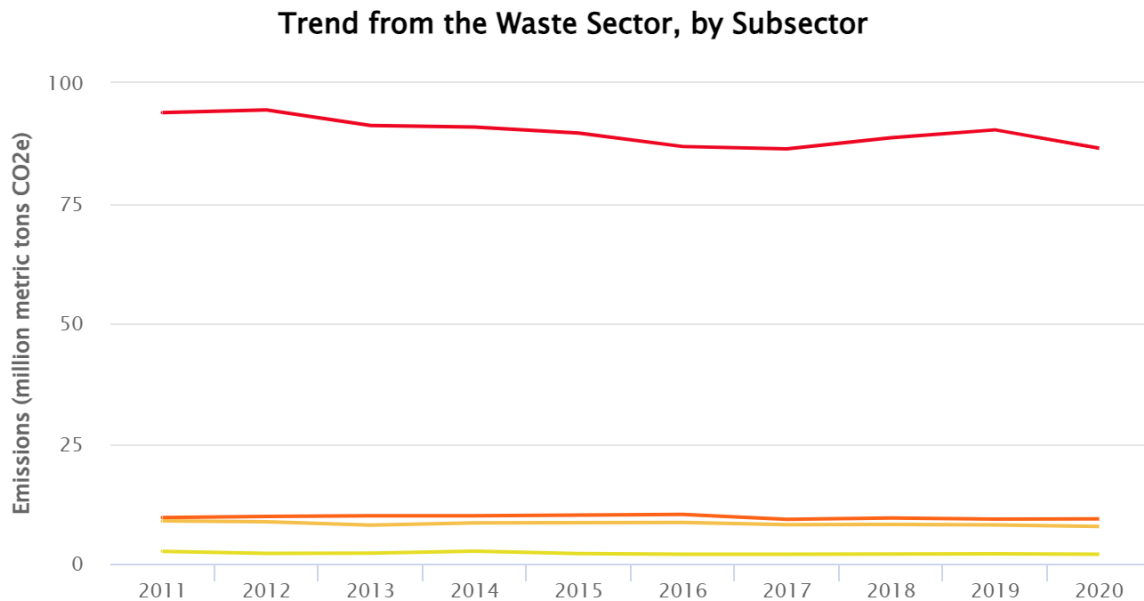
2020 Total Reported Direct Emissions from Waste, by Subsector (as of 8/7/2021).

2020 Total Reported Emissions from the Waste Sector, by Subsector



Sum of percentages may not equal 100% due to independent rounding.

Trend of Annual Reported GHG Emissions by Subsector (as of 8/7/2021).



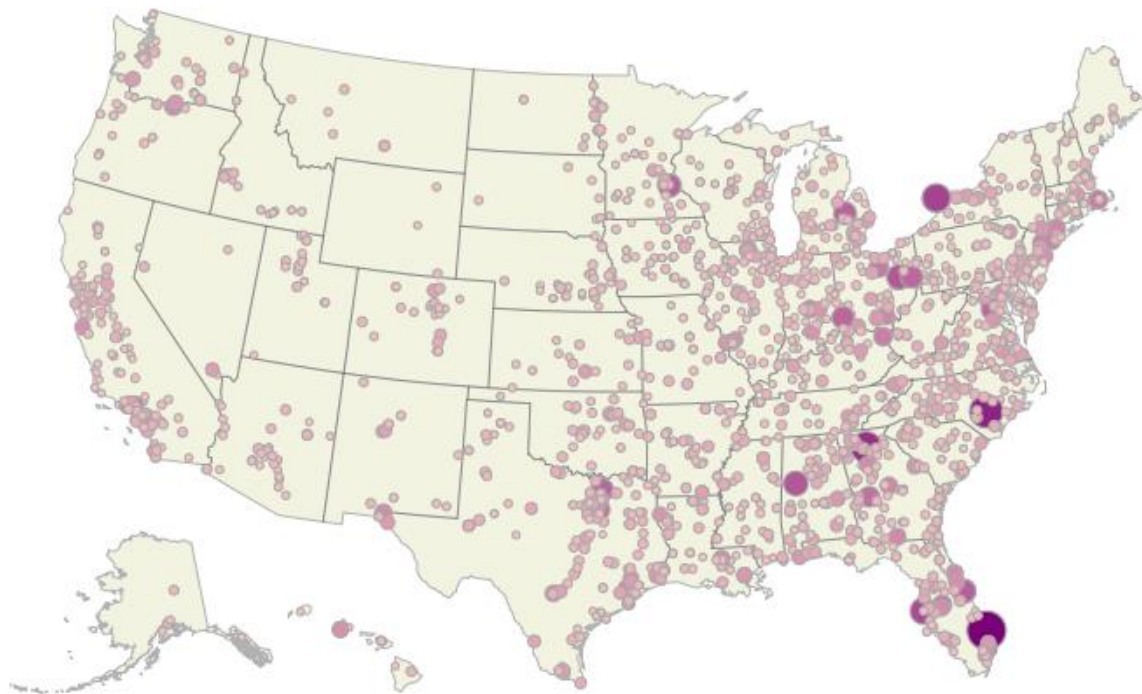
Click on sectors below to customize sectors displayed in chart

- Municipal Landfills
- Solid Waste Combustion
- Industrial Landfills
- Wastewater Treatment

What factors influenced the [trend in emissions for the waste sector?](#)

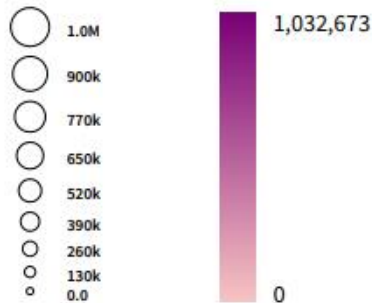
Location and emissions range for each reporting facility in the waste sector (as of 8/7/2021).

These maps show the locations of direct-emitting facilities. The size of a circle corresponds to the quantity of emissions reported by that facility.



Legend

**GHGRP 2020
Miscellaneous Combustion
Sector
Facility Emissions
(metric tons CO₂e)**



Number of reporters and emissions in the waste sector (as of 8/7/2021)

Waste Sector — Greenhouse Gas Emissions Reported to the GHGRP (all emissions values presented in million metric tons CO ₂ e)										
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Number of facilities:	1,645	1,652	1,638	1,631	1,548	1,512	1,503	1,499	1,473	1,465
Total emissions (CO₂e):	114.9	115.0	111.3	111.9	110.3	107.5	105.6	108.3	109.6	105.5
Emissions by greenhouse gas (CO₂e)										
• Carbon dioxide (CO ₂):	10.1	10.3	10.5	10.6	10.8	11.1	10.1	10.5	10.1	10.3
• Methane (CH ₄):	104.4	104.4	100.4	100.9	99.1	96.1	95.1	97.5	99.1	94.8
• Nitrous oxide (N ₂ O):	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.4	0.3	0.3

Totals may not equal sum of individual GHGs due to independent rounding.

CO₂ emissions from the combustion of biomass are NOT included in emissions totals provided above.

Number of reporters and 2020 emissions (CO₂e) per waste industry subsector		
Industry Sector	2020 Number of Reporters	2020 Emissions (million metric tons CO₂e per year)
Municipal Landfills	1,123	86.5
Wastewater Treatment	124	1.9
Industrial Landfills	166	7.8
Solid Waste Combustion	59	9.3

Other EPA Resources

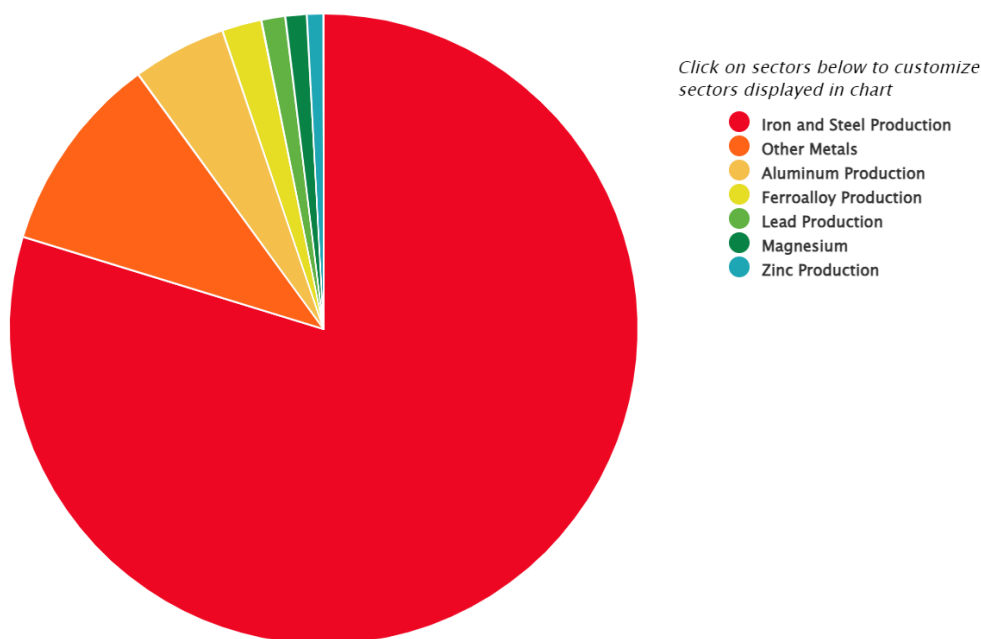
- [U.S. Greenhouse Gas Inventory Report](#)

GHGRP 2020: Metals

The metals sector consists of metal production facilities that smelt, refine, and/or cast ferrous and nonferrous metals, including primary aluminum, ferroalloy, iron and steel, lead, magnesium, and zinc, from ore, pig, or scrap using electrometallurgical and other methods. The sector also includes foundries and any other metal production facility operating under NAICS codes beginning with 331 (Primary Metal Manufacturing). Primary aluminum, ferroalloy, iron and steel, lead, magnesium, and zinc production facilities report GHG emissions from metal smelting, refining, and/or casting activities, as well as from stationary fuel combustion sources. All other metal production facilities report only the GHG emissions from stationary fuel combustion sources.

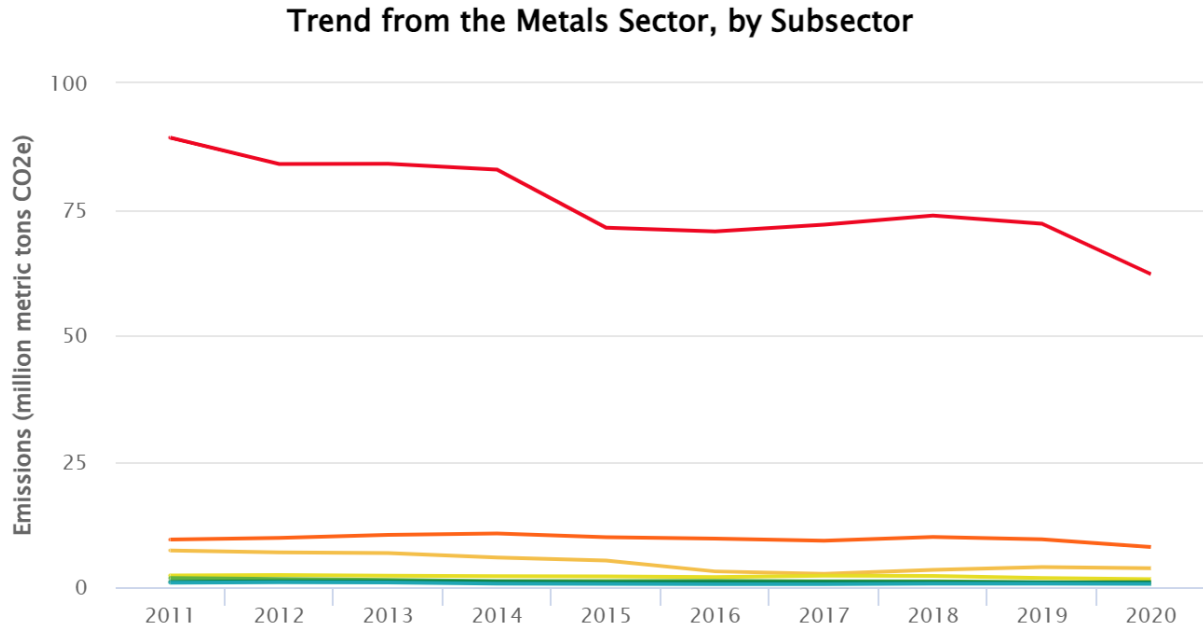
2020 Total Reported Direct Emissions from Metals, by Subsector (as of 8/7/2021).

2020 Total Reported Emissions from the Metals Sector, by Subsector



Sum of percentages may not equal 100% due to independent rounding.

Trend of Annual Reported GHG Emissions by Subsector (as of 8/7/2021).



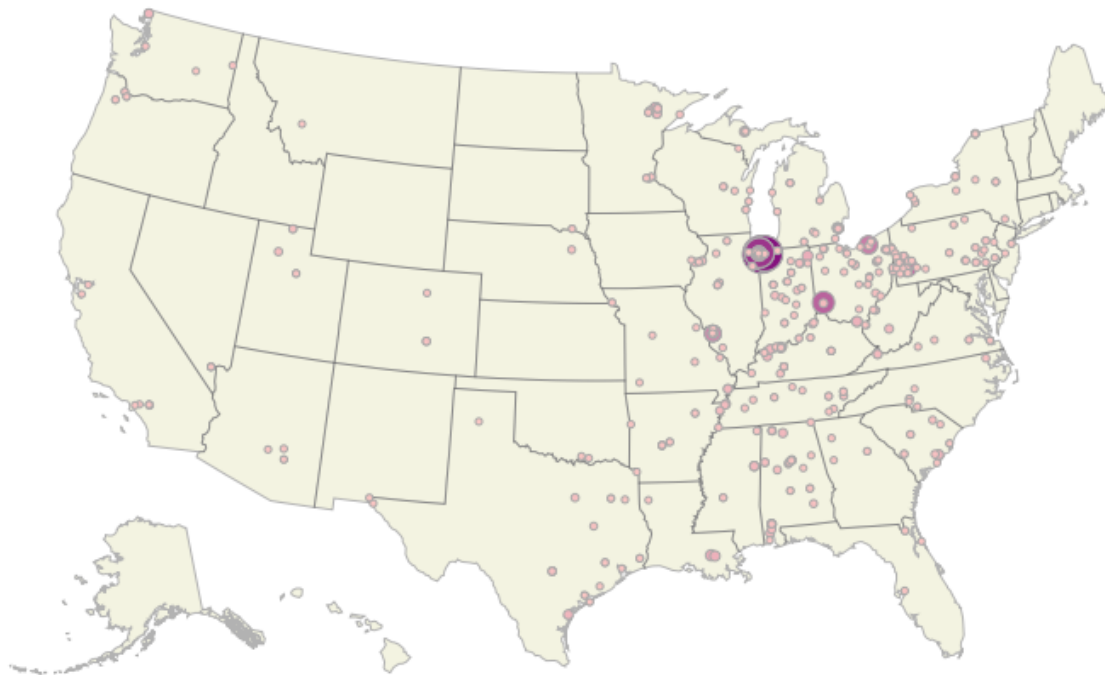
Click on sectors below to customize sectors displayed in chart

- Iron and Steel Production
- Other Metals
- Aluminum Production
- Ferrous Alloy Production
- Magnesium
- Lead Production
- Zinc Production

What factors influenced the [trend in emissions for metals production](#)?

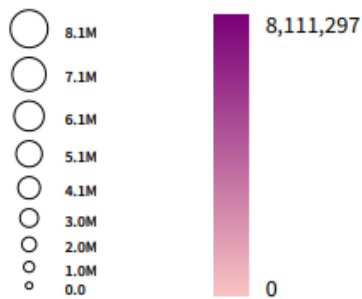
Location and emissions range for each reporting facility in the metals sector (as of 8/7/2021).

This map shows the locations of direct-emitting facilities. The size of a circle corresponds to the quantity of emissions reported by that facility.



Legend

GHGRP 2020
Metals Sector
Facility Emissions
(metric tons CO₂e)



Number of reporters and emissions in the metals sector (as of 8/7/2021)

Metals Sector — Greenhouse Gas Emissions Reported to the GHGRP										
(all emissions values presented in million metric tons CO ₂ e)										
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Number of facilities	299	301	303	306	303	304	298	306	300	294
Total emissions (CO₂e)	112.0	106.8	106.9	104.5	91.4	88.3	88.8	92.2	90.0	77.9
Emissions by greenhouse gas (CO ₂ e)										
• Carbon dioxide (CO ₂)	107.0	102.5	102.8	101.1	88.6	86.0	87.0	89.8	87.7	75.7
• Methane (CH ₄)	**	**	**	**	**	**	**	**	**	**
• Nitrous oxide (N ₂ O)	**	**	**	**	**	**	**	**	**	**
• Hydrofluorocarbons (HFCs)	**	**	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
• Perfluorocarbons (PFCs)	3.5	2.9	3.0	2.5	2.0	1.4	1.0	1.6	1.7	1.6
• Sulfur hexafluoride (SF ₆)	1.5	1.3	1.0	0.7	0.7	0.8	0.7	0.7	0.6	0.5

Totals may not equal sum of individual GHGs due to independent rounding.

** Total reported emissions are less than 0.05 million metric tons CO₂e.

CO₂ emissions from the combustion of biomass are NOT included in emissions totals provided above.

Number of reporters and 2020 emissions (CO₂e) per metal industry subsector		
Industry Sector	2020 Number of Reporters	2020 Emissions (million metric tons CO₂e per year)
Aluminum Production	7	3.8
Ferroalloy Production	9	1.6
Iron and Steel Production	122	62.1
Lead Production	11	1.0
Magnesium Production	9	0.9
Zinc Production	5	0.7
Other Metals	131	8.0

Other EPA Resources

- [U.S. Greenhouse Gas Inventory Report](#)

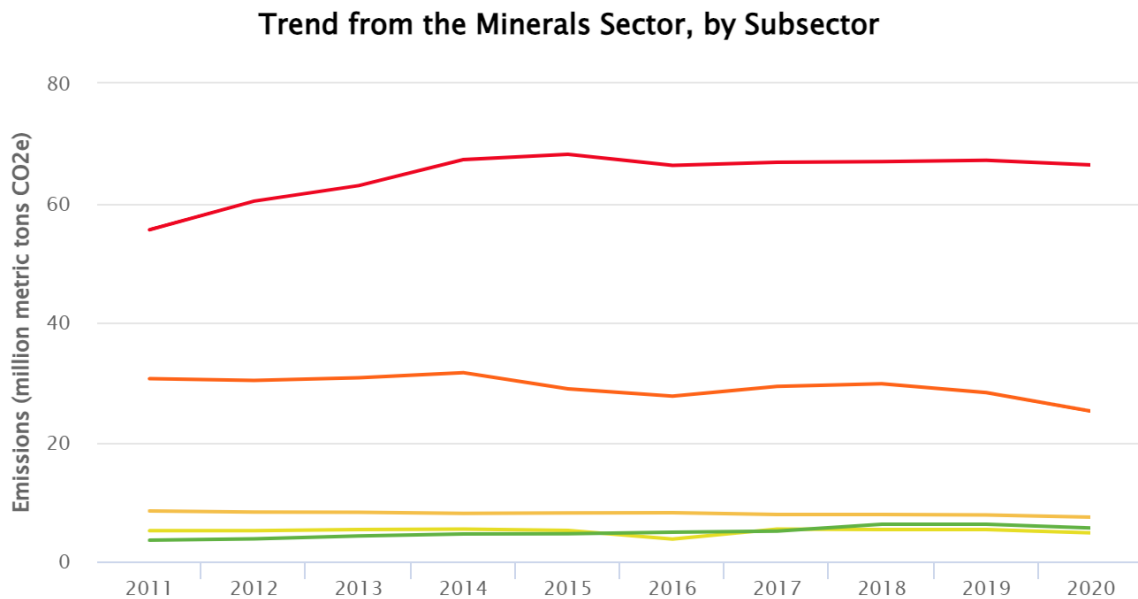
GHGRP 2020: Minerals

The minerals sector consists of cement production, glass production, lime manufacturing, soda ash manufacturing, and any other mineral production facility operating under NAICS codes beginning with 327 (Non-metallic Mineral Product Manufacturing). Facilities under this sector transform mined or quarried non-metallic minerals — such as sand, gravel, stone, clay, and refractory materials — into products for intermediate or final consumption. Glass, cement, soda ash and lime facilities report both process emissions from the calcination of carbonate-based raw materials and GHG emissions from stationary fuel combustion sources. All other mineral production facilities report only GHG emissions from stationary fuel combustion sources. A small number of facilities in this sector collect CO₂ either for use in their other production processes (e.g., sugar refining), to transfer to other users, or to sequester or otherwise inject underground. This sector includes the CO₂ emissions reported for those processes.

2020 Total Reported Direct Emissions from Minerals, by Subsector (as of 8/7/2021).

Sum of percentages may not equal 100% due to independent rounding.

Trend of Annual Reported GHG Emissions by Subsector (as of 8/7/2021).



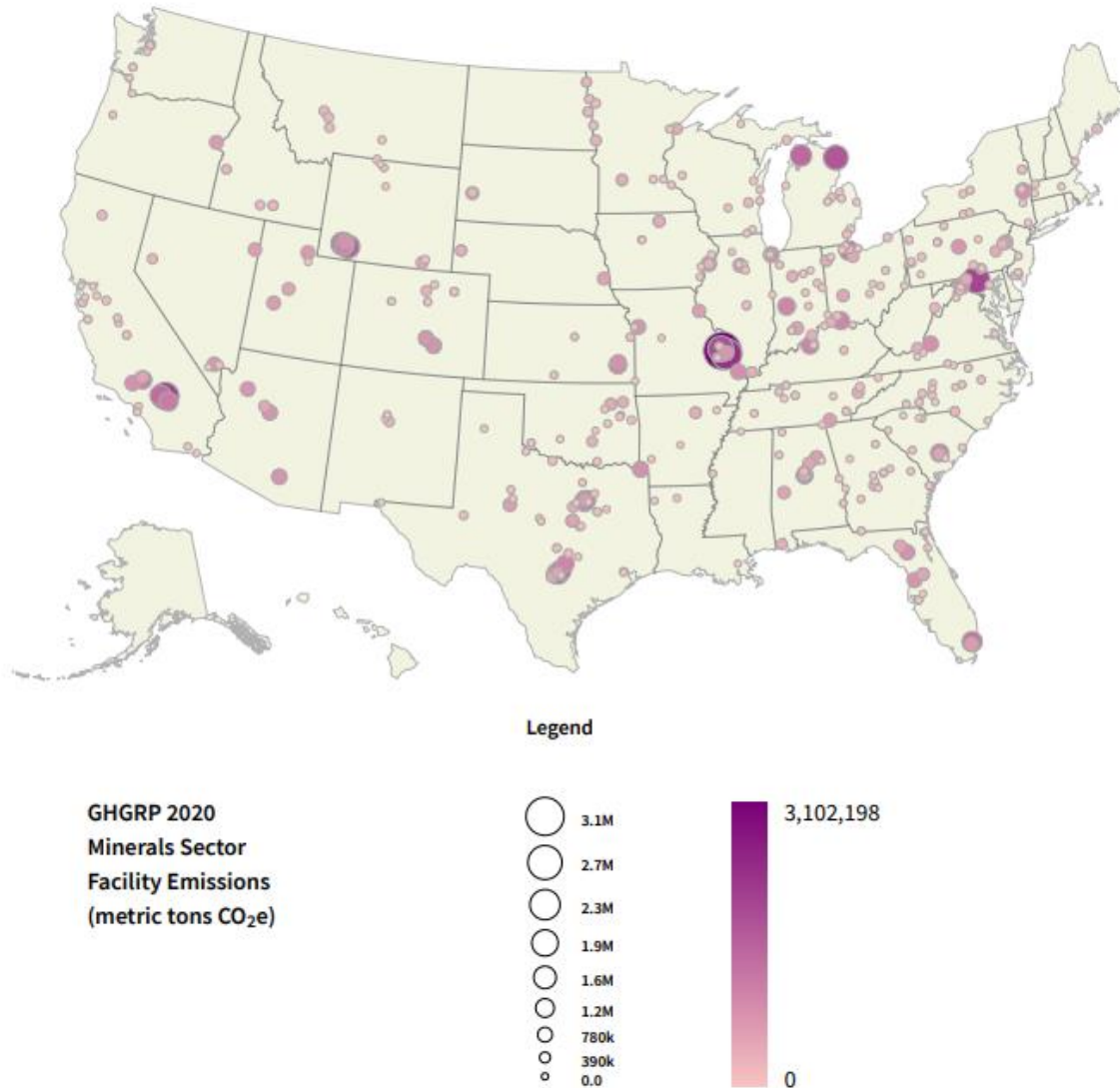
Click on sectors below to customize sectors displayed in chart

- Cement Production
- Lime Manufacturing
- Glass Production
- Soda Ash Manufacturing
- Other Minerals

What factors influenced the [trend in emissions for minerals production?](#)

Location and emissions range for each reporting facility in the minerals sector (as of 8/7/2021).

These maps show the locations of direct-emitting facilities. The size of a circle corresponds to the quantity of emissions reported by that facility.



Number of reporters and emissions in the minerals sector (as of 8/7/2021)

Minerals Sector — Greenhouse Gas Emissions Reported to the GHGRP										
(all emissions values presented in million metric tons CO ₂ e)										
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Number of facilities:	367	369	378	381	381	374	377	384	383	379
Total emissions (CO ₂ e):	103.2	107.8	111.5	117.0	115.0	110.8	114.4	116.1	114.8	109.3
Emissions by greenhouse gas (CO₂e)										
• Carbon dioxide (CO ₂):	102.9	107.5	111.2	116.5	114.7	110.5	114.1	115.8	114.5	109.1
• Methane (CH ₄):	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1

• Nitrous oxide (N ₂ O):	0.2	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2
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Totals may not equal sum of individual GHGs due to independent rounding.

CO₂ emissions from the combustion of biomass are NOT included in emissions totals provided above.

Number of reporters and 2020 emissions (CO ₂ e) per minerals industry subsector		
Industry Sector	2020 Number of Reporters	2020 Emissions (million metric tons CO ₂ e)
Cement Production	92	66.4
Lime Manufacturing	71	25.1
Glass Production	101	7.4
Soda Ash Manufacturing	4	4.8

Other EPA Resources

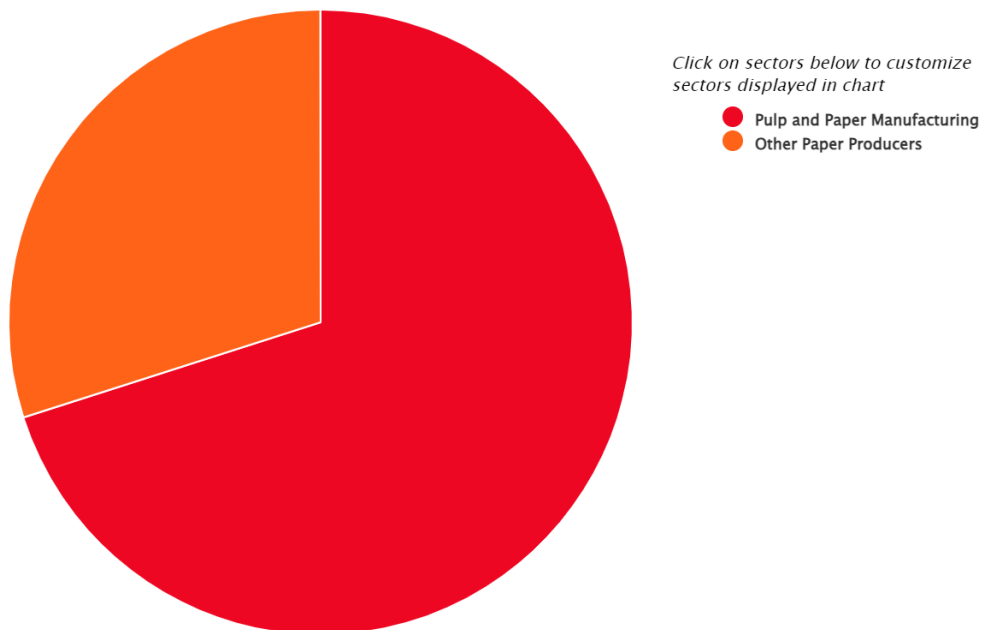
- [U.S. Greenhouse Gas Inventory Report](#)

GHGRP 2020: Pulp and Paper

The pulp and paper sector consists of facilities that produce market pulp or that manufacture pulp and paper. Facilities that have pulping processes report the GHG emissions from chemical recovery units, lime kilns, and stationary fuel combustion units. In addition to emissions from pulp production processes, the sector includes combustion emissions from facilities that produce paper products from purchased pulp, produce secondary fiber from recycled paper, convert paper into paperboard products, operate coating and laminating processes, print products (such as books, labels, business cards, stationery, and business forms), and perform support activities (such as data imaging, plate-making services, and bookbinding). Emissions from industrial landfills and industrial wastewater treatment at these facilities in the pulp and paper sector are included in the waste sector.

2020 Total Reported Direct Emissions from Pulp and Paper, by Subsector (as of 8/7/2021).

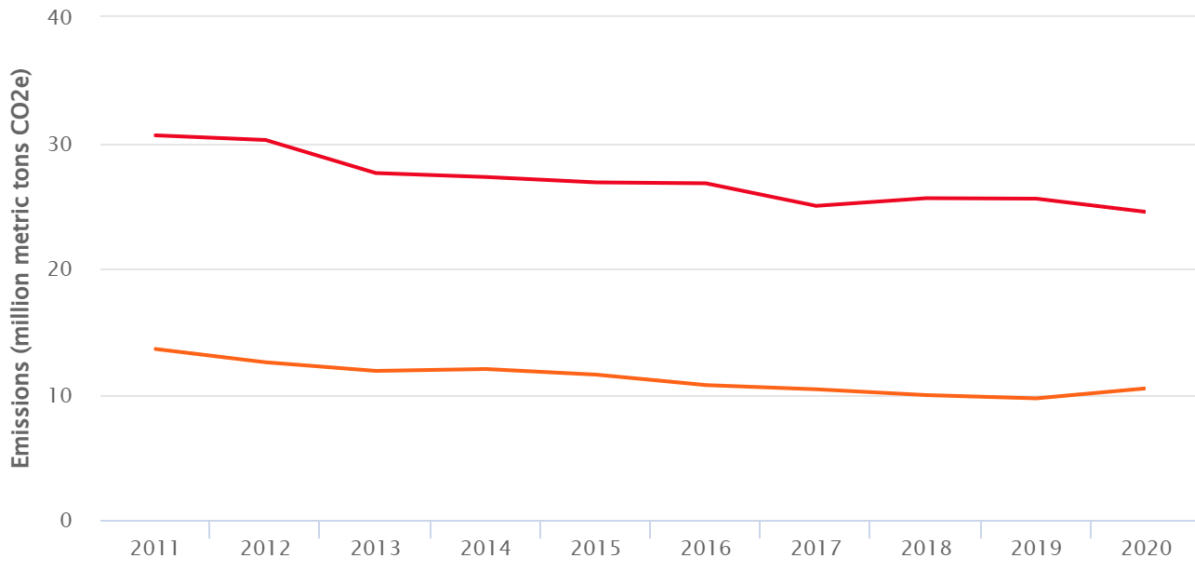
2020 Total Reported Emissions from the Pulp and Paper Sector, by Subsector



Sum of percentages may not equal 100% due to independent rounding.

Trend of Annual Reported GHG Emissions by Subsector (as of 8/7/2021)

Trend from the Pulp and Paper Sector, by Subsector



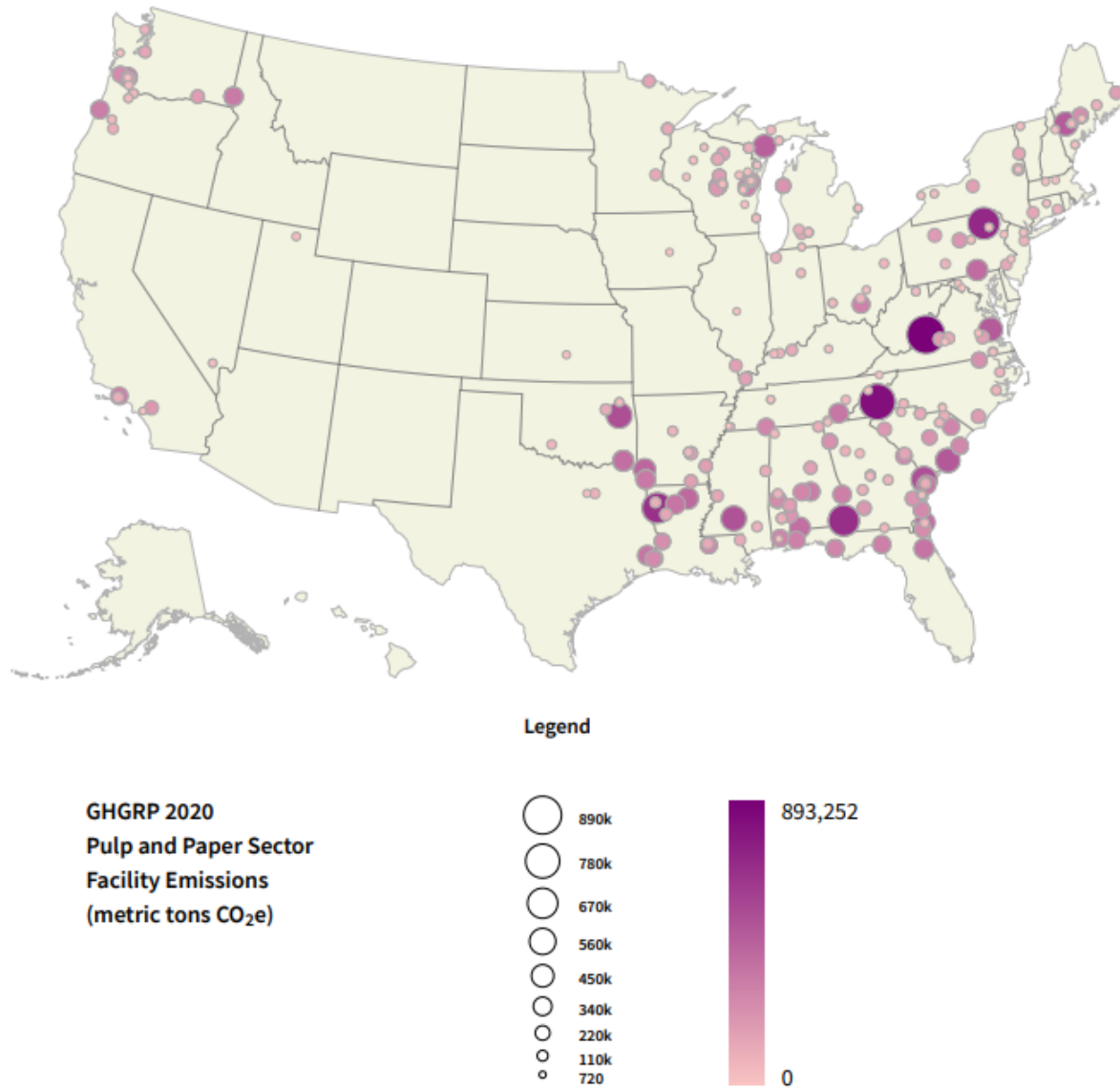
Click on sectors below to customize sectors displayed in chart

— Pulp and Paper Manufacturing
 — Other Paper Producers

What factors influenced the [trend in emissions for pulp and paper?](#)

Location and emissions range for each reporting facility in the pulp and paper sector (as of 8/7/2021).

This map shows the locations of direct-emitting facilities. The size of a circle corresponds to the quantity of emissions reported by that facility.



Number of reporters and emissions in the pulp and paper sector (as of 8/7/2021)

Pulp and Paper Sector — Greenhouse Gas Emissions Reported to the GHGRP (all emissions values presented in million metric tons CO ₂ e)										
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Number of facilities:	233	230	231	232	230	225	222	218	221	221
Total emissions (CO₂e):	44.2	42.8	39.4	39.3	38.4	37.5	35.4	35.5	35.2	35.0
Emissions by greenhouse gas (CO₂e)										
• Carbon dioxide (CO ₂):	41.2	39.8	38.6	38.5	37.6	36.8	34.7	34.9	34.6	34.4
• Methane (CH ₄):	1.1	1.1	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1
• Nitrous oxide (N ₂ O):	1.9	1.9	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.4

Totals may not equal sum of individual GHGs due to independent rounding.

CO₂ emissions from the combustion of biomass are NOT included in emissions totals provided above.

Number of reporters and 2020 emissions (CO₂e) per pulp and paper industry subsector		
Industry Sector	2020 Number of Reporters	2020 Emissions (million metric tons CO₂e)
Pulp and Paper Manufacturing	103	24.5
Other Paper Producers	118	10.5

Other EPA Resources

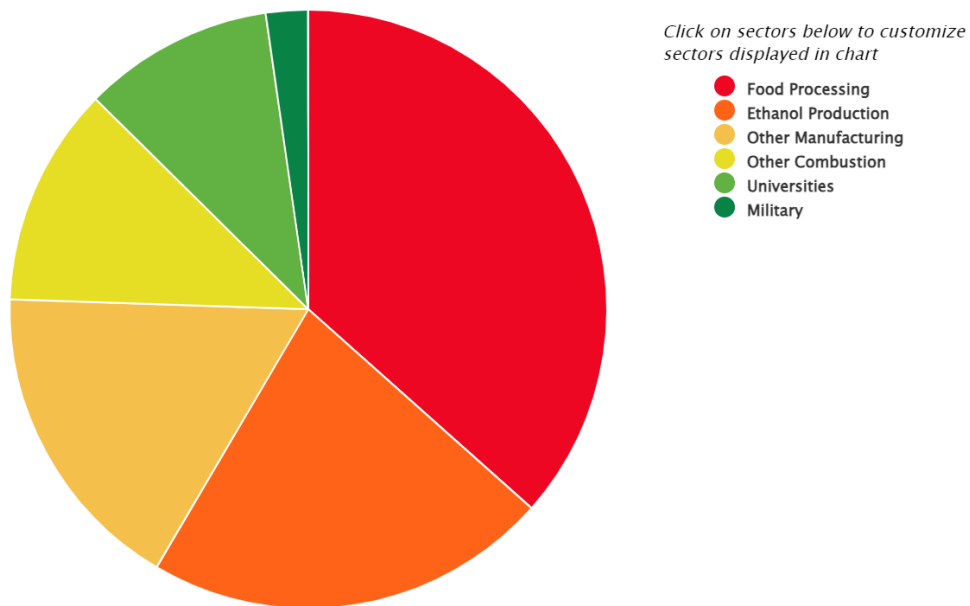
- [U.S. Greenhouse Gas Inventory Report](#)

GHGRP 2020: Miscellaneous Combustion

Miscellaneous Combustion comprises facilities that reported GHG emissions from stationary fuel combustion sources only and that are not part of any other sector. This category includes food processing, ethanol production, manufacturing operations, universities, military installations, and any combustion sources not included elsewhere, such as mining operations and hospitals.

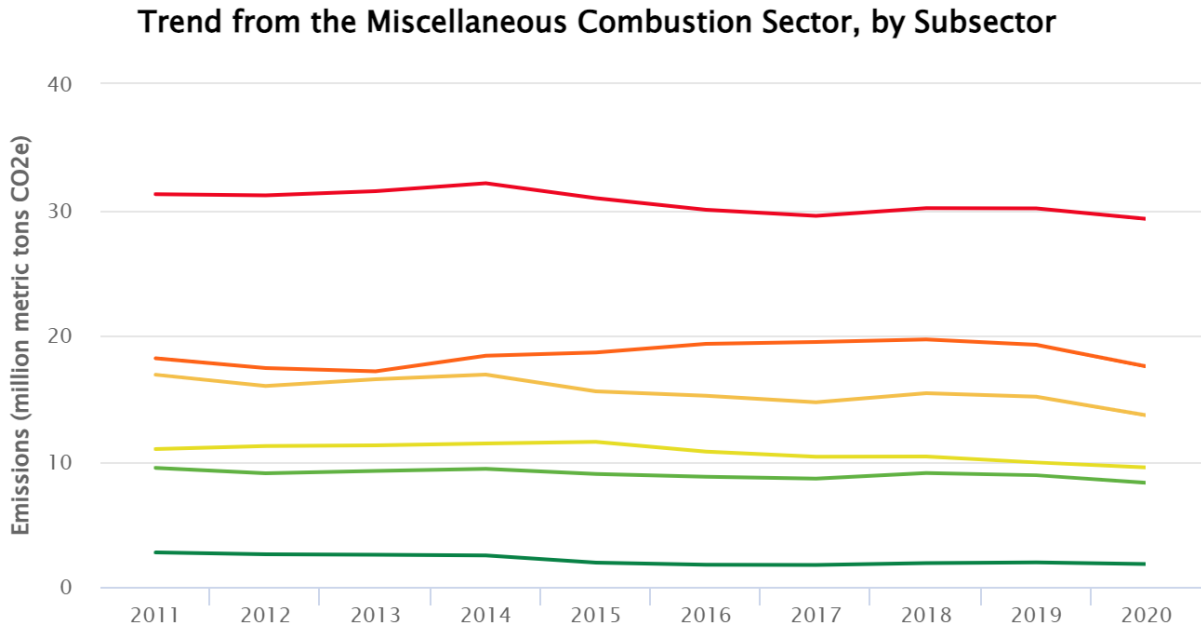
2020 Total Reported Direct Emissions from Miscellaneous Combustion, by Subsector (as of 8/7/2021).

2020 Total Reported Emissions from the Miscellaneous Combustion Sector, by Subsector



Sum of percentages may not equal 100% due to independent rounding.

Trend of Annual Reported GHG Emissions from Miscellaneous Combustion, by Subsector (as of 8/7/2021).



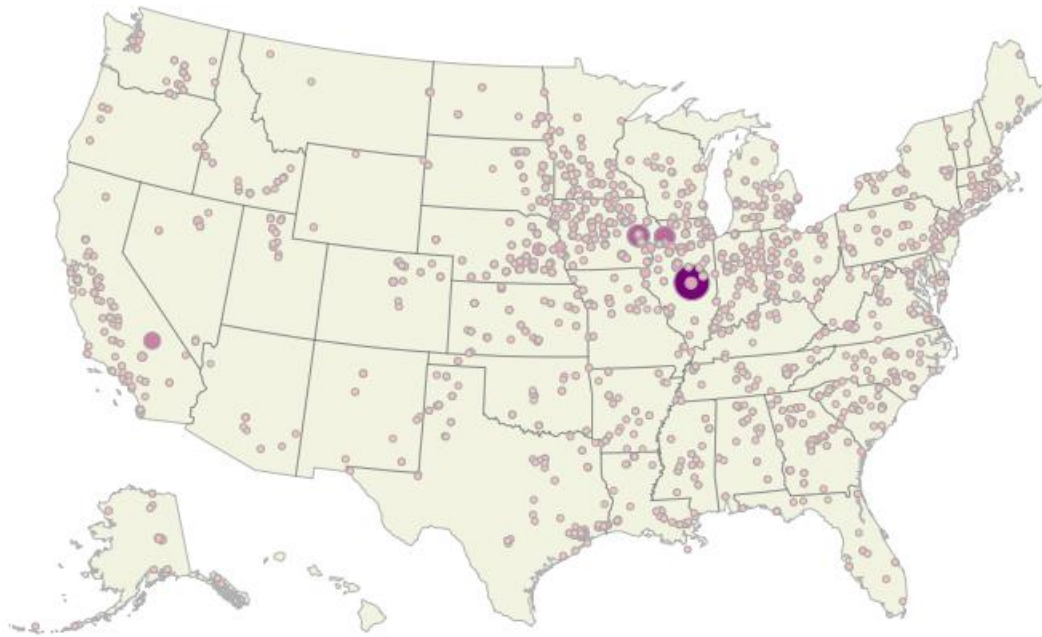
Click on sectors below to customize sectors displayed in chart

- Food Processing
- Ethanol Production
- Other Manufacturing
- Other Combustion
- Universities
- Military

What factors influenced the [trend in emissions for miscellaneous combustion](#)?

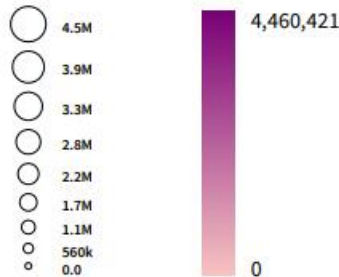
Location and emissions range for each reporting facility in the Miscellaneous Combustion sector (as of 8/7/2021).

These maps show the locations of direct-emitting facilities. The size of a circle corresponds to the quantity of emissions reported by that facility.



**GHGRP 2020
Waste Sector
Facility Emissions
(metric tons CO₂e)**

Legend



Number of reporters and emissions in the Miscellaneous Combustion sector (as of 8/7/2021)

Miscellaneous Combustion — Greenhouse Gas Emissions Reported to the GHGRP (all emissions values presented in million metric tons CO ₂ e)										
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Number of facilities:										
• Food Processing	319	330	337	341	347	342	336	337	338	342
• Ethanol Production	163	167	165	173	176	173	173	174	172	168
• Other Manufacturing	287	292	294	299	292	286	280	289	286	280
• Universities	112	115	114	117	117	115	115	116	116	115
• Military	43	44	43	43	38	34	33	35	36	34
• Other Combustion	161	171	175	184	186	175	167	166	168	168
Total emissions (CO₂e):										
Food Processing	31.2	31.1	31.5	32.1	30.9	30.0	29.5	30.1	30.1	29.3

Miscellaneous Combustion — Greenhouse Gas Emissions Reported to the GHGRP										
(all emissions values presented in million metric tons CO ₂ e)										
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
• Ethanol Production	18.2	17.4	17.1	18.4	18.6	19.3	19.5	19.7	19.3	17.5
• Other Manufacturing	16.9	16.0	16.5	16.9	15.5	15.2	14.7	15.4	15.1	13.6
• Universities	9.5	9.0	9.2	9.4	9.0	8.8	8.6	9.1	8.9	8.3
• Military	2.7	2.6	2.5	2.5	1.9	1.8	1.7	1.9	1.9	1.8
• Other Combustion	11.0	11.2	11.3	11.4	11.5	10.8	10.3	10.4	9.9	9.5
Emissions by greenhouse gas (CO₂e) Food Processing										
• Carbon dioxide (CO ₂):	31.1	31.0	31.3	31.9	30.8	29.8	29.4	30.0	30.0	29.1
• Methane (CH ₄):	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
• Nitrous oxide (N ₂ O):	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Ethanol Production										
• Carbon dioxide (CO ₂):	18.2	17.2	17.1	18.3	18.6	19.3	19.5	19.7	19.2	17.5
• Methane (CH ₄):	**	**	**	**	**	**	**	**	**	**
• Nitrous oxide (N ₂ O):	**	0.2	**	**	**	**	**	**	**	**
Other Manufacturing										
• Carbon dioxide (CO ₂):	16.8	15.9	16.4	16.8	15.5	15.1	14.6	15.3	15.1	13.6
• Methane (CH ₄):	**	**	**	**	**	**	**	**	**	**
• Nitrous oxide (N ₂ O):	0.1	0.1	0.1	0.1	**	**	**	**	**	**
Universities										
• Carbon dioxide (CO ₂):	9.4	9.0	9.2	9.4	9.0	8.7	8.6	9.0	8.9	8.3
• Methane (CH ₄):	**	**	**	**	**	**	**	**	**	**
• Nitrous oxide (N ₂ O):	**	**	**	**	**	**	**	**	**	**
Military										
• Carbon dioxide (CO ₂):	2.7	2.6	2.5	2.5	1.9	1.7	1.7	1.9	1.9	1.8
• Methane (CH ₄):	**	**	**	**	**	**	**	**	**	**
• Nitrous oxide (N ₂ O):	**	**	**	**	**	**	**	**	**	**
Other Combustion										
• Carbon dioxide (CO ₂):	10.9	11.2	11.2	11.4	11.5	10.8	10.3	10.4	9.9	9.5
• Methane (CH ₄):	**	**	**	**	**	**	**	**	**	**
• Nitrous oxide (N ₂ O):	**	**	**	**	**	**	**	**	**	**

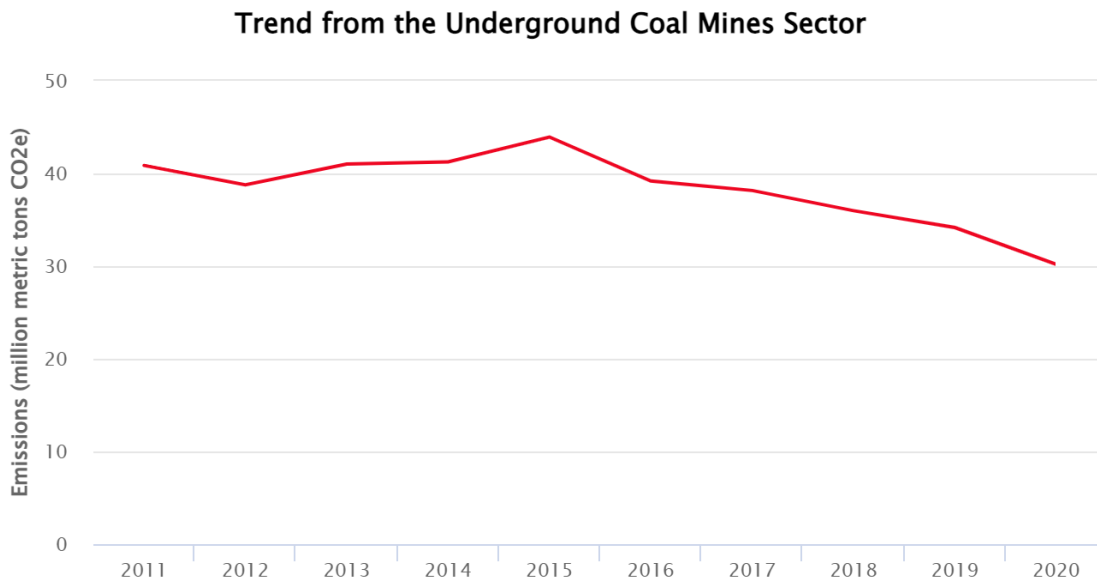
Totals may not equal sum of individual GHGs due to independent rounding.

** Total reported emissions are less than 0.05 million metric tons CO₂e.

GHGRP 2020: Underground Coal Mines

The Underground Coal Mines sector consists of all underground coal mines that liberate 36,500,000 actual cubic feet of methane (equivalent to approximately 17,579 metric tons CO₂e) or more per year. Facilities in this sector include both underground coal mines under development and those categorized by the Mine Safety and Health Administration as active mines. Surface mines and abandoned mines are excluded from this category. Facility owners or operators must report the total annual methane liberated from ventilation and degasification systems as well as GHG emissions from any other source categories at the facility, such as stationary combustion devices.

Trend of Annual Reported Direct Emissions from the Underground Coal Mines Sector (as of 8/7/2021).



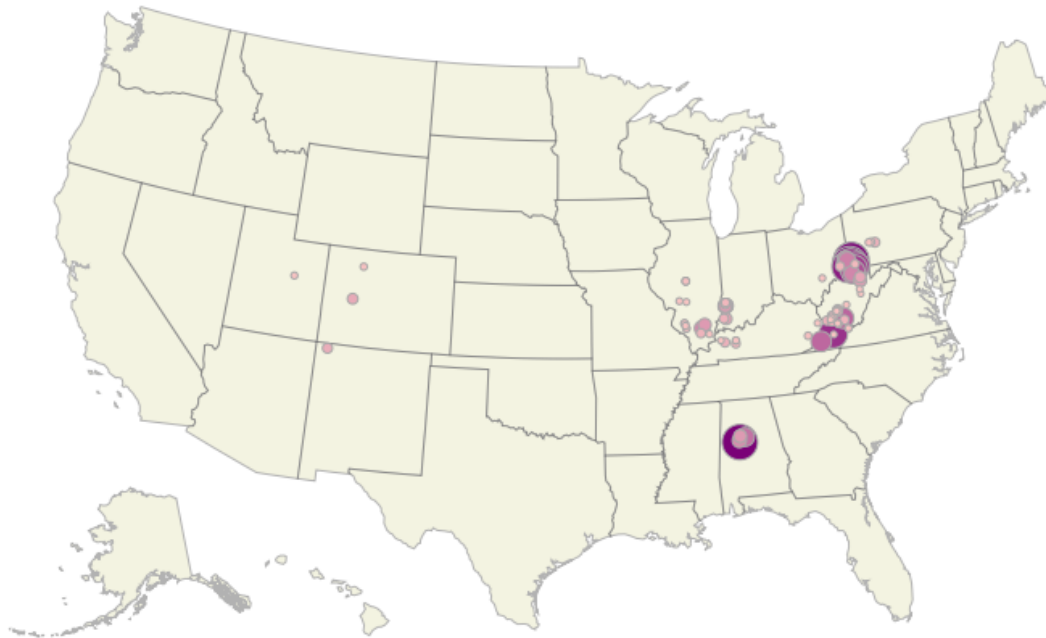
Click on sectors below to customize sectors displayed in chart

— Underground Coal Mines

What factors influenced the [trend in emissions for underground coal mines](#)?

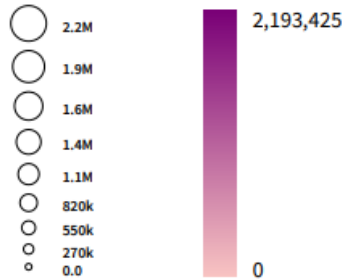
Location and emissions range for each reporting facility in the underground coal mines sector (as of 8/7/2021).

This map shows the locations of direct-emitting facilities. The size of a circle corresponds to the quantity of emissions reported by that facility.



**GHGRP 2020
Underground Coal Mines Sector
Facility Emissions
(metric tons CO₂e)**

Legend



Number of reporters and emissions in the underground coal mines sector (as of 8/7/2021)

Underground Coal Mines — Greenhouse Gas Emissions Reported to the GHGRP (all emissions values presented in million metric tons CO ₂ e)										
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Number of facilities:	117	118	131	130	125	95	81	77	69	71
Total emissions (CO₂e):	40.9	38.8	41.0	41.2	43.9	39.2	38.2	36.0	34.2	30.2
Emissions by greenhouse gas (CO₂e)										
• Carbon dioxide (CO ₂):	0.2	0.2	0.2	0.5	0.3	0.2	0.2	0.2	0.1	0.1
• Methane (CH ₄):	40.7	38.6	40.8	40.8	43.7	39.0	37.9	35.8	34.1	30.1
• Nitrous oxide (N ₂ O):	**	**	**	**	**	**	**	**	**	**

Totals may not equal sum of individual GHGs due to independent rounding.

** Total reported emissions are less than 0.05 million metric tons CO₂e.

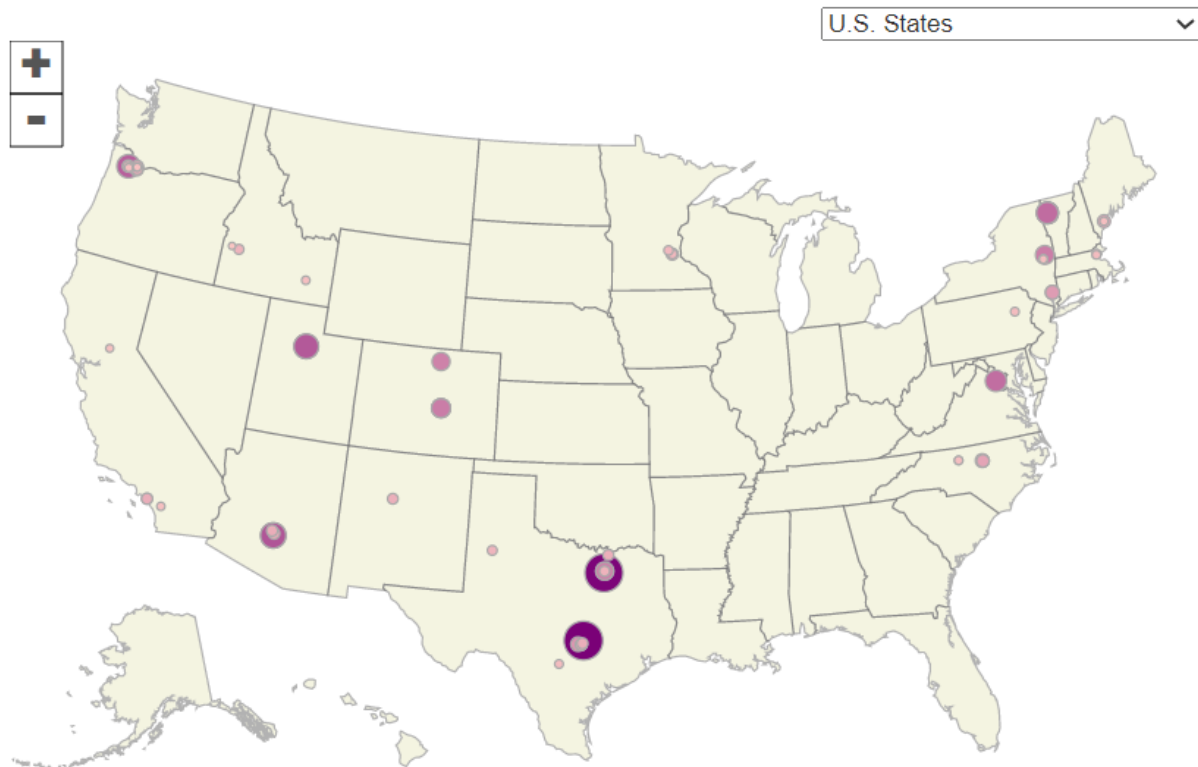
CO₂ emissions from the combustion of biomass are NOT included in the emissions totals provided above.

GHGRP 2020: Electronics Manufacturing

This source category includes, but is not limited to, facilities that manufacture semiconductors (including light-emitting diodes), micro-electromechanical systems (MEMS), liquid crystal displays (LCDs), and photovoltaic cells (PV). Specifically, this subsector consists of electronics manufacturing facilities with production processes that use plasma-generated fluorine atoms and other reactive fluorine-containing fragments to etch thin films, clean chambers for depositing thin films, clean wafers, or remove residual material. The source category also includes electronics manufacturing facilities with chemical vapor deposition processes or other production processes that use N₂O, and with processes that use fluorinated GHGs as heat transfer fluids (HTF) to control temperature or clean surfaces.

Location and emissions range for each reporting facility in the Electronics Manufacturing sector (as of 8/7/2021).

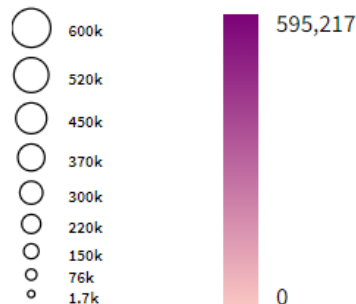
This map shows the locations of direct-emitting facilities. The size of a circle corresponds to the quantity of emissions reported by that facility.



Legend

GHGRP 2019
Electronics Manufacturing Sector
Facility Emissions
(metric tons CO₂e)

[Export Visualization](#)



Number of reporters and emissions in the electronics manufacturing sector (as of 8/7/2021)

Electronics Manufacturing — Greenhouse Gas Emissions Reported to the GHGRP										
(all emissions values presented in million metric tons CO ₂ e)										
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Number of facilities	56	56	58	59	58	53	51	49	48	48
Total emissions (CO₂e)	7.0	6.4	5.2	6.2	6.3	6.2	6.1	6.3	5.9	5.9
Emissions by greenhouse gas (CO₂e)										
• Carbon dioxide (CO ₂)	1.6	1.5	0.7	0.7	0.8	0.7	0.7	0.7	0.8	0.8
• Methane (CH ₄)	**	**	**	**	**	**	**	**	**	**
• Nitrous oxide (N ₂ O)	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.2	0.3
• Hydrofluorocarbons (HFCs)	0.2	0.2	0.2	0.3	0.3	0.3	0.4	0.4	0.4	0.4
• Hydrofluoroethers (HFEs)	**	**	**	**	**	**	**	**	**	**
• Perfluorocarbons (PFCs)	3.2	2.8	2.7	3.0	3.0	2.9	2.9	3.0	2.7	2.6
• Sulfur hexafluoride (SF ₆)	0.3	0.3	0.3	0.7	0.7	0.8	0.7	0.8	0.7	0.7
• Nitrogen trifluoride (NF ₃)	0.6	0.6	0.5	0.5	0.6	0.6	0.6	0.6	0.6	0.6
• Other Fully Fluorinated GHGs	0.7	0.8	0.6	0.8	0.7	0.6	0.6	0.7	0.6	0.6
• Very short-lived Compounds	**	**	**	**	**	**	**	**	**	**

Emissions of CO₂ and CH₄ are from stationary fuel combustion sources.

What factors influenced the [trend in emissions for electronics manufacturing?](#)

GHGRP 2020: Electrical Equipment Production and Use

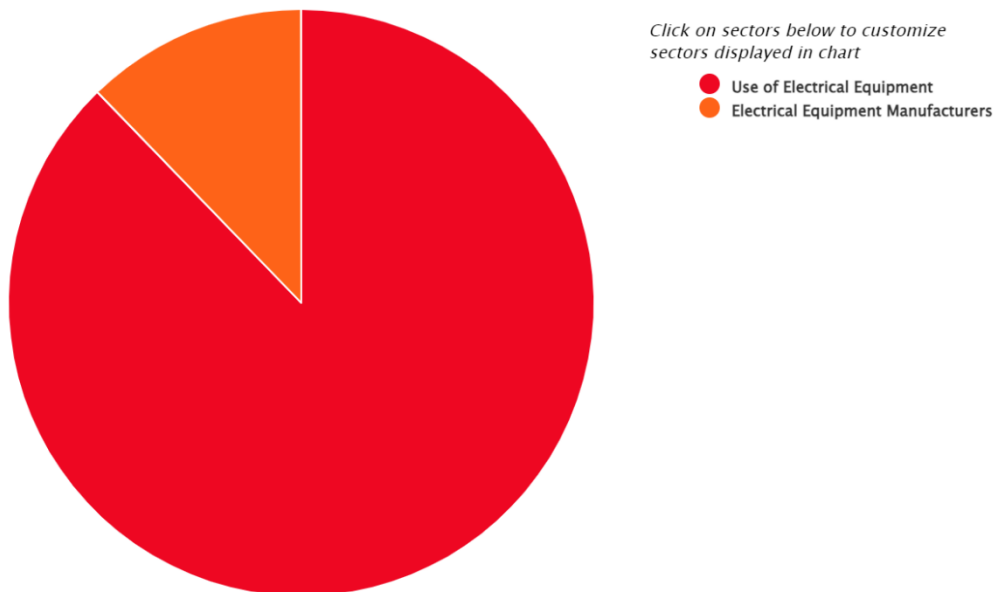
This source category includes electrical transmission and distribution systems and facilities that manufacture or refurbish electrical equipment.

The electrical transmission and distribution subsector consists of all electric transmission and distribution equipment insulated with or containing sulfur hexafluoride (SF₆) or perfluorocarbons (PFCs) within an electric power system. This equipment includes but is not limited to gas-insulated substations; circuit breakers; switchgear, including closed-pressure and hermetically sealed-pressure switchgear; gas-insulated lines containing SF₆ or PFCs; and gas containers such as pressurized cylinders, gas carts, electric power transformers, and other containers of SF₆ or PFCs. Emissions occur during installation, use, servicing, and decommissioning of the equipment.

The electrical equipment manufacturing subsector includes facilities that manufacture or refurbish electrical equipment. At these facilities, emissions occur during equipment testing and filling .

2020 Total Reported Direct Emissions from the Electrical Equipment Production and Use Sector, by Subsector (as of 8/7/2021).

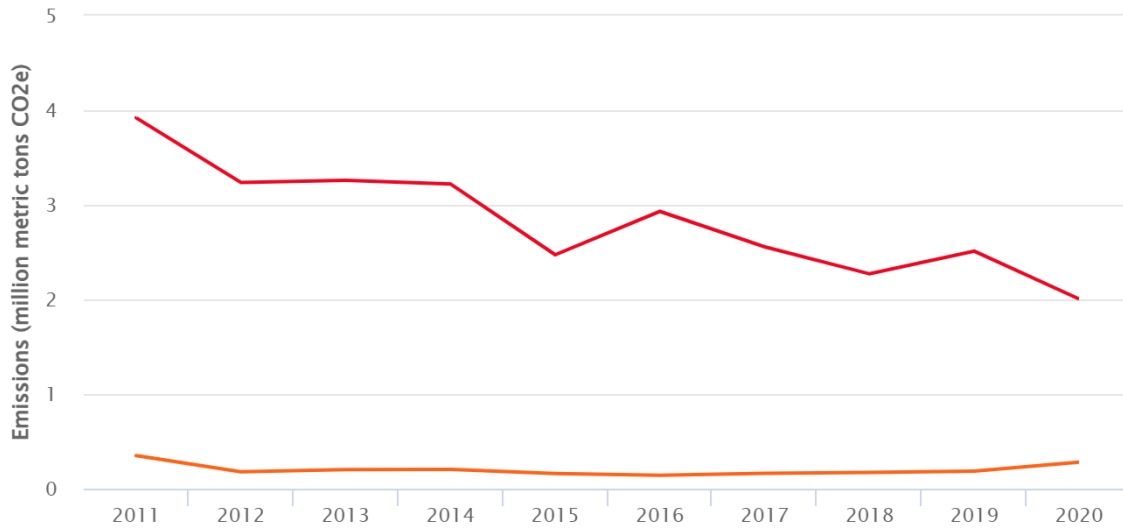
2020 Total Reported Emissions from the Electrical Equipment Sector, by Subsector



Sum of percentages may not equal 100% due to independent rounding.

Trend of Annual Reported GHG Emissions from the Electrical Equipment Production & Use Sector, by Subsector (as of 8/7/2021)

Trend from the Electrical Equipment Sector, by Subsector



Click on sectors below to customize sectors displayed in chart

— Use of Electrical Equipment
 — Electrical Equipment Manufacturers

What factors influenced the [trend in emissions for electrical equipment production and use?](#)

Number of reporters and emissions in the electrical equipment production and use sector (as of 8/7/2021)

Production and Use of Electrical Equipment — Greenhouse Gas Emissions Reported to the GHGRP										
(all emissions values presented in million metric tons CO ₂ e)										
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Number of facilities	127	128	127	125	112	95	83	90	91	94
Total emissions (CO₂e)	4.3	3.4	3.5	3.4	2.6	3.1	2.7	2.4	2.7	2.3
Emissions by greenhouse gas (CO₂e)										
• Carbon dioxide (CO ₂)	**	**	**	**	**	**	**	**	**	**
• Methane (CH ₄)	**	**	**	**	**	**	**	**	**	**
• Nitrous oxide (N ₂ O)	**	**	**	**	**	**	**	**	**	**
• Perfluorocarbons (PFCs)	**	**	**	**	**	**	**	**	**	**
• Sulfur hexafluoride (SF ₆)	4.3	3.4	3.4	3.4	2.6	3.1	2.7	2.4	2.7	2.3

Totals may not equal sum of individual GHGs due to independent rounding.

** Total reported emissions are less than 0.05 million metric tons CO₂e.

CO₂ emissions from the combustion of biomass are NOT included in emissions totals provided above.

Number of reporters and 2020 emissions (CO₂e) per electrical equipment industry subsector		
Industry Sector	2020 Number of Reporters	2020 Emissions (million metric tons CO₂e)
Use of Electrical Equipment	89	2.0
Electrical Equipment Manufacturers	5	0.3

GHGRP 2020: Supplier Highlights

For reporting year (RY) 2020, over 900 suppliers of fuels and industrial gases reported to EPA's Greenhouse Gas Reporting Program (GHGRP).

Suppliers do not report direct emissions, but instead report the quantity of GHGs that would be emitted if the fuels and industrial GHGs that they produce, import, or export each year were combusted, released, or oxidized. Emissions associated with these fuels and industrial gases do not occur at the supplier's facility but instead occur throughout the country, wherever they are used. An example of this is gasoline, which is supplied into the U.S. economy by a relatively small number of entities and consumed by many individual vehicles throughout the country.

The GHG quantity reported by suppliers might not always result in GHG emissions, and the emissions might not take place during that particular reporting year. However, the data from suppliers provide important information on the structure and flow of products through the economy and these products may ultimately result in greenhouse gas emissions. In addition, data reported by fossil fuel and industrial gas suppliers can account for greenhouse gases emitted by the numerous sources that use these products but do not report under the GHGRP due to their low individual emissions (passenger vehicles, for example). Emissions reported by suppliers can be accessed through the [suppliers section](#) of FLIGHT.

For 2020, 975 suppliers submitted a GHG report. The majority of GHG emissions associated with the transportation, residential, and commercial sectors are accounted for by these suppliers.

Industry Sector	Number of Reporters⁹
Suppliers of Coal-Based Liquid Fuels	1
Suppliers of Petroleum Products	234
Suppliers of Natural Gas and Natural Gas Liquids	
• <i>Natural Gas Local Distribution Companies</i>	365
• <i>Natural Gas Liquids Fractionators</i>	124
Suppliers of Industrial GHGs and Products Containing GHGs	
• <i>Industrial GHG Suppliers</i>	93
• <i>Imports and Exports of Equipment Pre-charged with Fluorinated GHGs or Containing Fluorinated GHGs in Closed-cell Foams</i>	47
Suppliers of Carbon Dioxide	130

⁹ Totals sum to more than 949, because suppliers that fall into more than one sector are counted multiple times.

GHGRP 2020: Suppliers of Natural Gas and Natural Gas Liquids

This sector consists of entities that supply natural gas and natural gas liquids. Natural gas supply is reported by Local Distribution Companies (LDCs) and natural gas liquids (NGL) supply is reported by fractionators.

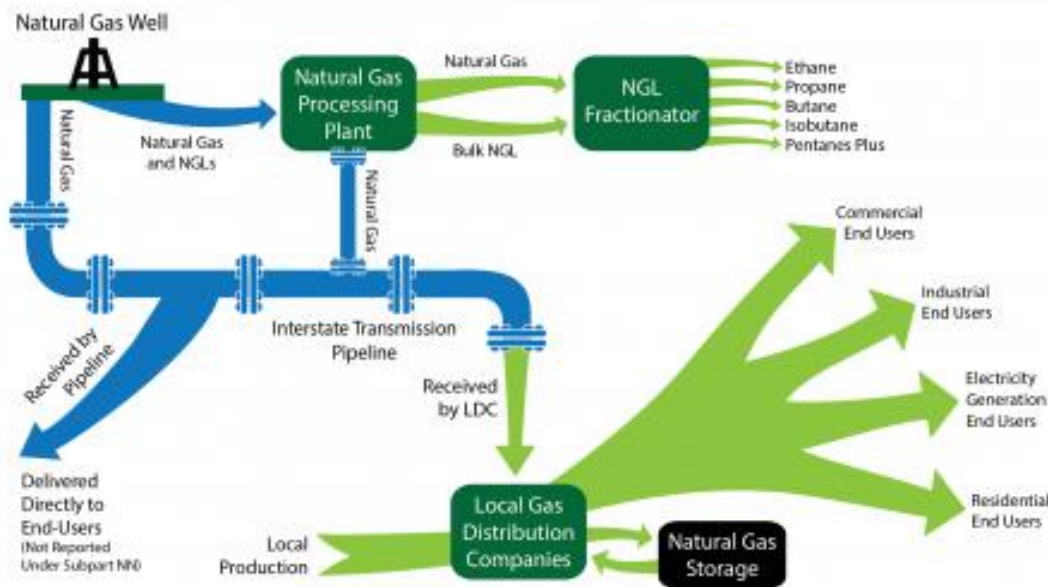
NGL Fractionators are installations that receive natural gas or bulk natural gas liquids from producers, fractionate these raw inputs into individual products (ethane, propane, normal butane, isobutane, or pentanes plus), and then supply those products into the economy.

Local Distribution Companies receive natural gas from a transmission pipeline company and physically deliver the gas to end users.

These Suppliers report the quantity of CO₂ that would be emitted if the fuels they supply each year were combusted. Emissions associated with these fuels do not occur at the supplier's facility but instead occur throughout the country, wherever they are used. The full GHG quantity reported by suppliers might not always result in GHG emissions, and the emissions might not take place during the year in which they are reported. An example is ethane supplied by NGL fractionators, which is often used to produce plastics.

The GHG quantities reported by suppliers can be accessed through the [suppliers section](#) of FLIGHT. Some natural gas and natural gas liquids suppliers also report direct emissions from petroleum and natural gas operations. [Click here](#) to learn more.

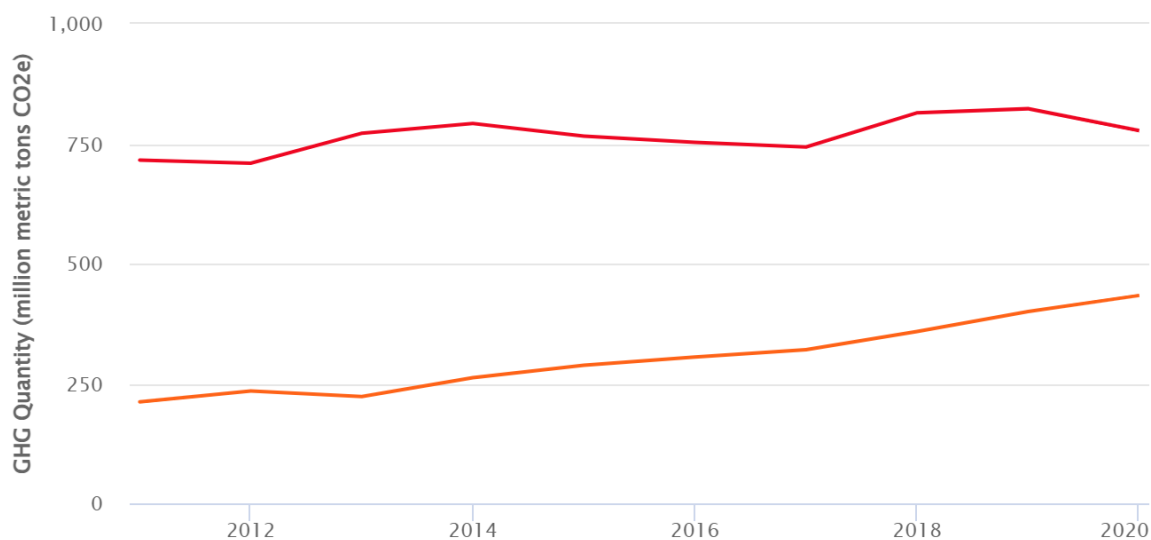
Graphic of the natural gas and NGL supply chain



Quantities marked with green arrows are reported to EPA by NGL Fractionators or Local Distribution Companies under Subpart NN.

Trend of annual reported CO₂ quantity associated with natural gas and NGL supply

Trend from the Natural Gas & Natural Gas Liquids Sector, by Subsector



Click on sectors below to customize sectors displayed in chart

— Natural Gas Distribution

— Natural Gas Liquids Fractionation

What factors influenced the [trends in emissions for suppliers of natural gas and natural gas liquids?](#)

Emissions and Deliveries

Natural Gas and Natural Gas Liquids Suppliers Sector – Carbon Dioxide Quantity Reported to the GHGRP (million metric tons CO ₂)										
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Local Distribution Companies										
Number of reporters:	381	386	385	383	383	382	380	377	372	365
CO ₂ Quantity	715.9	709.5	771.9	792.2	765.6	752.6	743.0	814.5	822.9	777.5
Natural Gas Liquids Fractionators										
Number of reporters:	116	119	126	130	125	124	124	123	123	124
CO ₂ Quantity ^a	211.5	234.3	222.8	261.9	288.1	305.2	320.3	358.3	400.0	433.6

a. Excludes CO₂ reported by NGL Fractionators whose reported quantities are classified as confidential business information (CBI).

Natural Gas Deliveries Reported by LDCs (Mscf)										
End-User	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total Reported Deliveries	12,833,353,747	12,814,244,074	13,959,558,590	14,402,368,456	13,884,740,129	13,567,742,923	13,431,234,983	14,807,509,305	14,899,920,715	14,085,448,957

Natural Gas Deliveries Reported by LDCs (Mscf)										
Residential Customers	4,639,182,835	4,085,716,741	4,848,463,986	5,005,539,667	4,545,932,813	4,289,262,998	4,350,008,201	4,917,495,719	4,924,927,705	4,599,748,952
Commercial Customers	3,040,460,385	2,807,075,083	3,195,684,202	3,372,005,196	3,109,690,450	3,022,104,164	3,074,740,991	3,394,321,546	3,413,816,901	3,068,249,448
Industrial Customers	3,294,130,257	3,518,276,435	3,673,846,067	3,788,452,965	3,689,029,269	3,763,470,702	3,841,709,293	4,020,879,210	4,047,628,896	3,791,252,077
Electricity Generating Facilities	1,859,580,270	2,403,175,815	2,241,564,335	2,236,370,627	2,540,087,597	2,492,905,059	2,164,776,498	2,474,812,830	2,513,547,214	

Mscf means thousand standard cubic feet of gas.

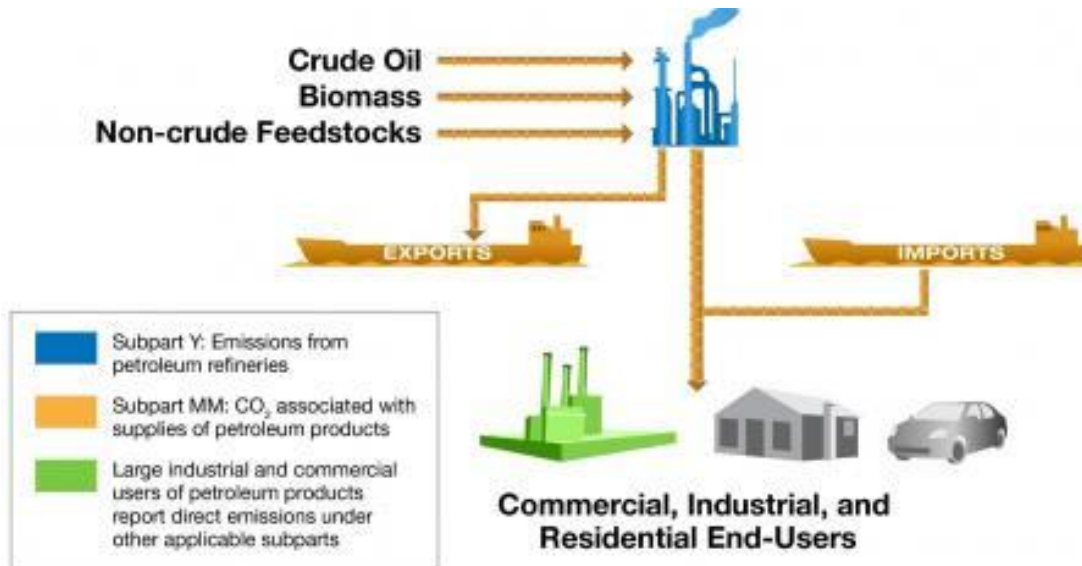
GHGRP 2020: Suppliers of Petroleum Products

This sector comprises petroleum refineries and importers and exports of petroleum products and natural gas liquids. These suppliers do not report direct emissions, but instead report the quantity of CO₂ that would be emitted if the fuels and other products they supply each year were combusted. Petroleum refineries also report the volume of all feedstocks entering the refinery.

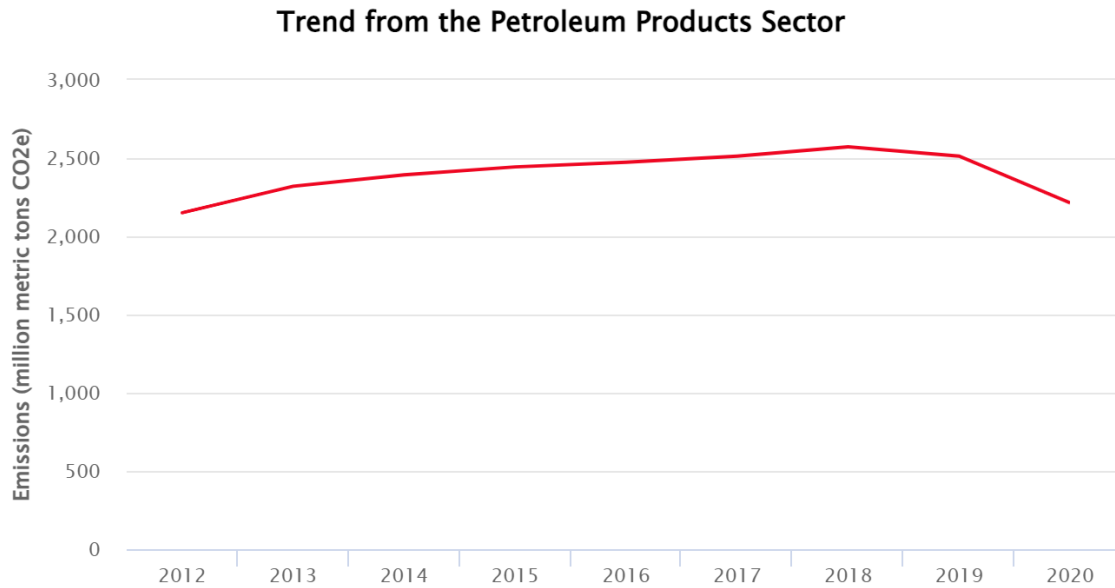
Emissions associated with these products do not occur at the supplier's facility but instead occur throughout the country, wherever they are used. The full GHG quantity reported by suppliers might not always result in GHG emissions, and the emissions might not take place during that particular reporting year. An example is ethylene, which is a byproduct from petroleum refining that is often used to produce plastics.

The GHG quantities reported by suppliers can be accessed through the [suppliers section](#) of FLIGHT. Petroleum refineries also report direct emissions under other applicable subparts.

Graphic of the petroleum product supply chain



Trend of Annual Reported CO₂ Quantity Associated with Refinery Petroleum Products Produced (as of 8/7/2021)



Click on sectors below to customize sectors displayed in chart

— Petroleum Refineries

Number of reporters and emissions associated with refinery petroleum products produced

Petroleum Product Suppliers Sector - Number of Reporters									
	2012	2013	2014	2015	2016	2017	2018	2019	2020
Importers	86	87	90	92	89	91	82	83	83
Exporters	60	61	64	64	68	71	64	60	64
Petroleum Refineries	137	136	136	137	136	137	135	136	136

Petroleum Refineries - CO ₂ Quantity Associated with Supplied Products ^a (million metric tons CO ₂)									
	2012	2013	2014	2015	2016	2017	2018	2019	2020
Petroleum Refineries	2,150.7	2,320.2	2,393.3	2,443.9	2,473.4	2,512.4	2,569.7	2,512.1	2,213

^a Carbon dioxide quantities shown in this table exclude petroleum refineries whose carbon dioxide quantities are considered [confidential business information](#)

GHGRP 2020: Suppliers of Industrial GHGs and Products Containing GHGs

This sector comprises industrial greenhouse gas (GHG) suppliers and entities that import or export certain products that contain [fluorinated greenhouse gases](#). These suppliers do not report direct emissions, but instead report the equivalent quantity of CO₂ that would be emitted if the gases that they produce, import, or export each year were released to the atmosphere.

Industrial GHG Suppliers. Entities that [manufacture, import, or export fluorinated greenhouse gases](#) or nitrous oxide in bulk report as suppliers of industrial GHGs under Subpart OO of the GHGRP. The number of reporters displayed in the table below includes all reporters subject to Subpart OO, not just those reporting supply of the specific compounds listed in the table titled Quantity (Net Supply) of GHGs Reported.

Importers and Exporters of (1) equipment that is pre-charged with fluorinated greenhouse gases (e.g., electrical equipment and air conditioners) and (2) closed cell foams containing fluorinated greenhouse gases (e.g., insulation contained inside refrigerators; insulation boardstock) report under Subpart QQ.

Number of Reporters Subject to Subparts OO and QQ

Industry Sector	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Industrial GHG Suppliers (OO)	49	64	72	71	74	74	72	77	75	76	93
Producers (Facilities)	21	24	25	24	22	22	22	22	22	22	25
Importers	25	39	43	43	48	45	47	53	51	49	66
Exporters	19	24	26	25	26	26	25	23	23	22	27
Importers and Exporters of Fluorinated Gases in Products (QQ)	N/A ^a	37	43	44	47	47	48	48	47	43	47
Importers	N/A ^a	29	36	36	41	41	41	42	40	37	40
Exporters	N/A ^a	27	32	33	34	33	33	31	32	28	32

^a Importers and Exporters of Fluorinated Gases in Products were not required to report 2010 data.

The total number of suppliers reporting under OO (and QQ) is less than the sum of the producers, importers, and exporters reporting under OO (and QQ) because some reporters qualify as multiple types of suppliers.

Quantity (Net Supply) of GHGs Reported

(Quantities are presented in million metric tons per year of net CO₂e^a)

Industry Sector	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Industrial GHG Suppliers											
Saturated HFCs	235 ^c	250	242	290	269	292	243	290	306	314	309
Sulfur hexafluoride (SF ₆), in bulk	18	34	35	27	30	25	25	22	28	34	24
Imports minus exports of saturated HFCs in products and foams	N/A	7.4	17.7	16.6	24.6	26.2	28.1	32.4	34.1	29.6	35.2
Imports minus exports of SF ₆ in pre-charged equipment	N/A	-0.25	b	-0.18	-0.16	-0.14	-0.13	-0.12	-0.13	-0.083	-0.06

^a Net supply or net CO₂e means CO₂e quantities of bulk gas produced + imported – exported – transformed – destroyed.

^b At this time, the aggregation does not meet EPA's criteria for ensuring that CBI is protected.

^c EPA is currently evaluating whether this aggregation meets EPA's criteria for ensuring that CBI is protected.

All values are as of 1/5/2022.

GHGRP 2020: Capture, Supply, and Underground Injection of Carbon Dioxide

EPA's Greenhouse Gas Reporting Program (GHGRP) collects key information regarding the capture, supply, and underground injection of carbon dioxide (CO₂) in the United States. Greenhouse gas (GHG) data from these activities are reported under the following GHGRP subparts:

- Suppliers of CO₂ ([subpart PP](#)) covers facilities that capture CO₂ from industrial sources and processes or extract it from natural CO₂-bearing formations for supply into the economy.
- Underground injection of CO₂ ([subpart UU](#)) covers facilities that inject CO₂ underground for enhanced oil and gas recovery (ER), acid gas injection/disposal, carbon storage research and development (R&D), or for any other purpose other than geologic sequestration.
- Geologic sequestration of CO₂ ([subpart RR](#)) provides a mechanism for facilities to monitor and report to EPA amounts of CO₂ sequestered. Facilities submit a plan for monitoring, reporting and verifying CO₂ sequestered underground. Once the plan is approved, facilities report basic information on CO₂ received for injection, data related to the amounts of CO₂ sequestered, and annual monitoring activities. EPA approved the first "monitoring, reporting, and verification" plan in December 2015 and data will be reported starting in the 2016 reporting year.

GHGRP, 2020 ^a	Reporting Facilities
Supply of CO₂ (Subpart PP)^b	
Number of suppliers of CO ₂ captured (industrial sources)	113
Number of suppliers of CO ₂ produced (natural sources)	12
Underground Injection of CO₂ (Subpart UU)	
Number of facilities reporting CO ₂ received for enhanced oil and gas recovery ^c	70
Number of facilities reporting CO ₂ received for acid gas injection/disposal, and other purposes	23
Geologic Sequestration of CO₂ (Subpart RR)	
Number of facilities reporting geologic sequestration of CO ₂	6
^a As of August 7, 2021	
^b The GHGRP also collects data from importers and exporters of carbon dioxide. These data are not provided in the table but these reporters can be identified through FLIGHT.	
^c Does not include facilities that conduct enhanced oil and gas recovery and that also report geologic sequestration of CO ₂ under Subpart RR.	

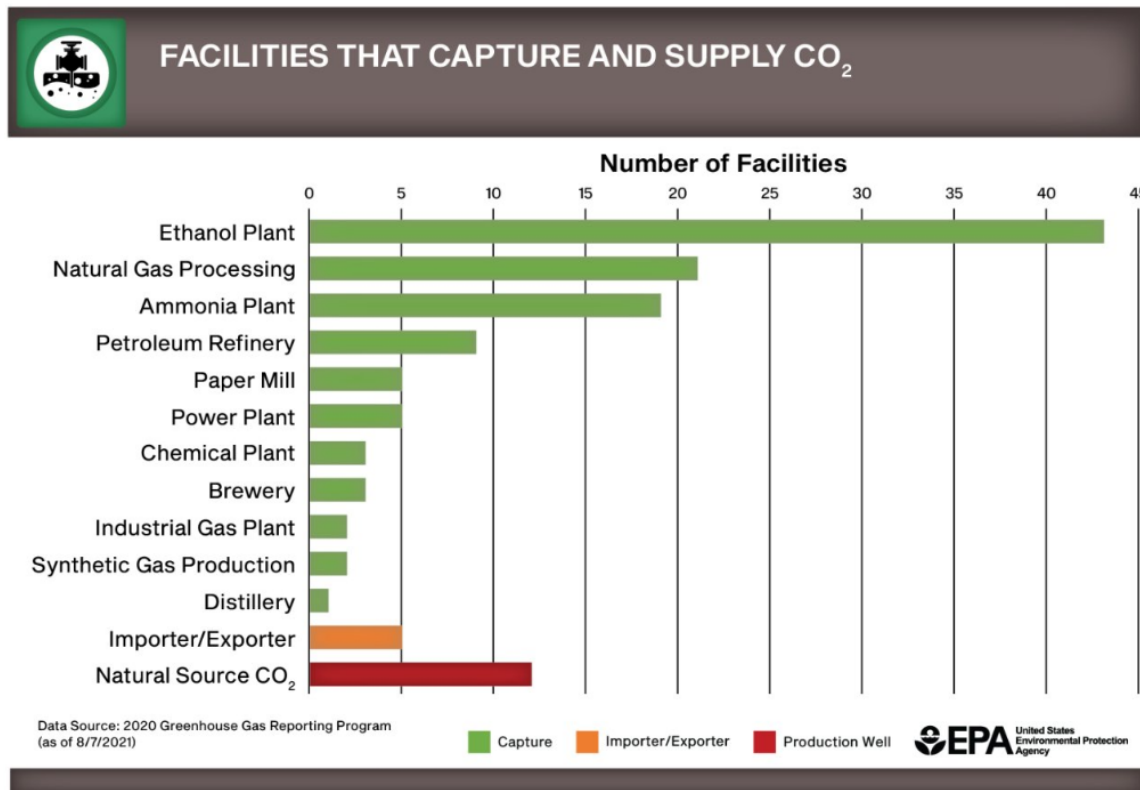
GHGRP, 2020 ^a	Amount (MMT) ^b
Supply of CO₂^c	
CO ₂ captured (industrial sources)	17.5
CO ₂ produced (natural sources)	27.2
Primary End Uses of Captured and Produced CO₂	
Enhanced oil and gas recovery ^c	35.2
Food and Beverage	5.0
Other ^d	4.5
Geologic Sequestration of CO₂	

GHGRP, 2020 ^a	Amount (MMT) ^b
CO ₂ sequestered in the reporting year (2020)	6.8
^a As of August 7, 2021 ^b Million Metric Tons ^c The GHGRP also collects data from importers and exporters of carbon dioxide. These data are not provided in the table but these reporters can be identified through FLIGHT. ^d Includes cleaning and solvent use, fumigants and herbicides, transportation and storage of explosives, fire-fighting equipment, industrial and municipal water/wastewater treatment, pulp and paper, metal fabrication, greenhouse plant growth, geologic sequestration, and unknown (which may include enhanced oil and gas recovery).	

GHGRP, Cumulative Over All Reporting Years ^a	Amount (MMT) ^b
Geologic Sequestration of CO₂	
Geologic Sequestration of CO ₂ (cumulative CO ₂ sequestered by all subpart RR facilities over all reporting years of GHGRP)	31.8
^a As of August 7, 2021 ^b Million Metric Tons	

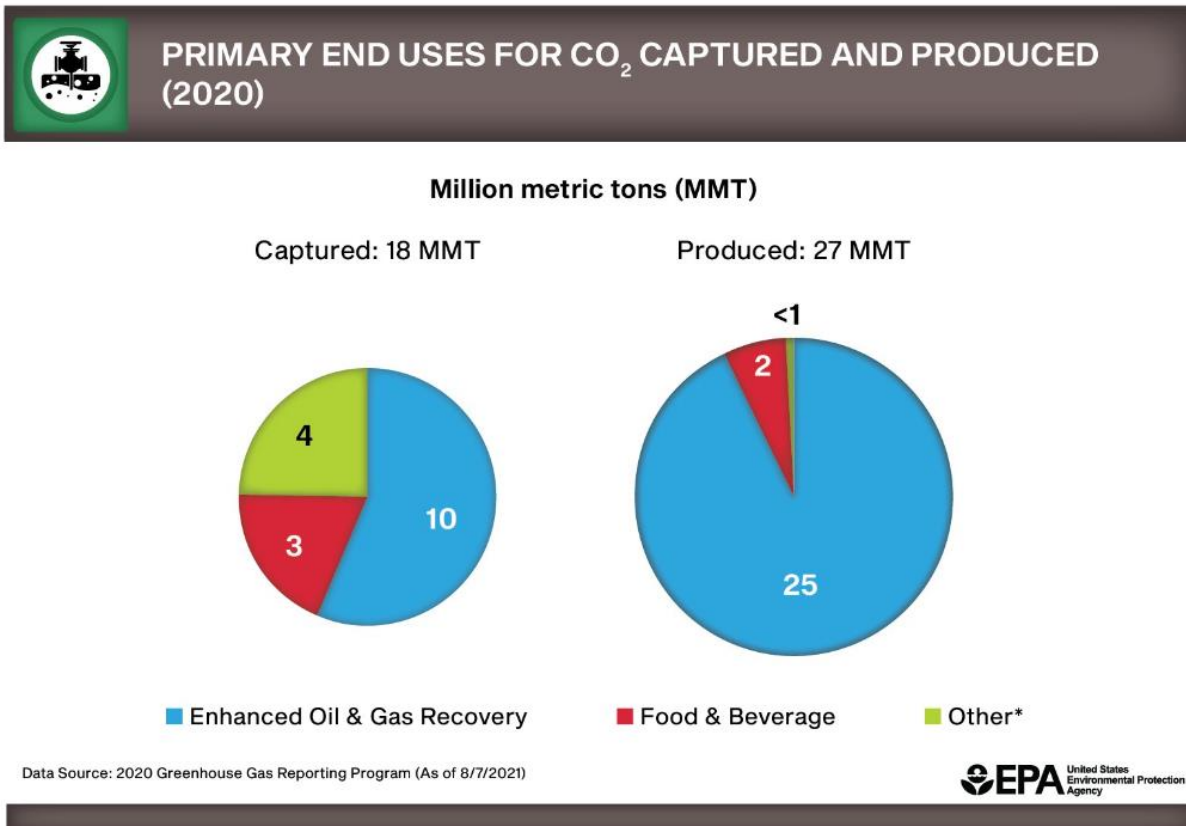
Capture and Supply of CO₂

Ethanol, natural gas, and ammonia production are among the top three industrial facility types that capture CO₂ for supply into the economy.



In 2020¹, most of the CO₂ captured from industrial processes (57 percent) and nearly all of the CO₂ produced from natural sources (93 percent) was used for ER. Food and beverage manufacturing is the second most common end use, followed by other end uses such as pulp and paper manufacturing, fire-fighting equipment, and metal fabrication.

¹ As of 8/7/2021.



* Includes cleaning and solvent use, fumigants and herbicides, transportation and storage of explosives, fire-fighting equipment, industrial and municipal water/wastewater treatment, pulp and paper, metal fabrication, greenhouse plant growth, long term storage, and unknown (which may include ER).

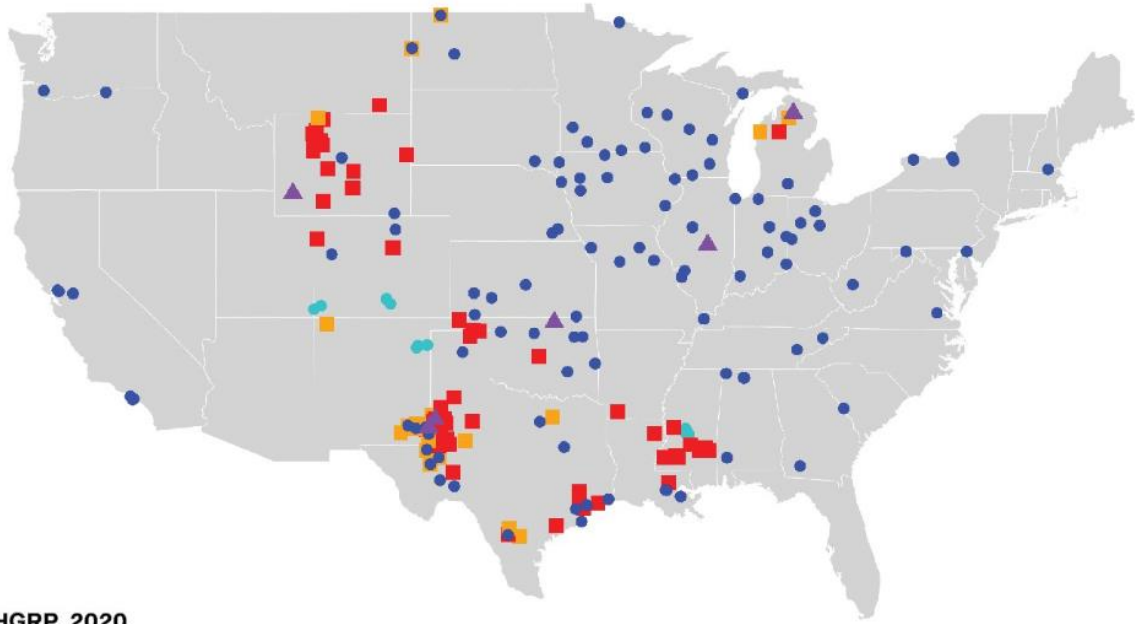
** Note that some CO₂ suppliers reported the primary end use for captured or produced CO₂ as "unknown." It is believed that the quantities reported by CO₂ suppliers as "unknown" account for the difference between CO₂ received for ER and CO₂ supplied for ER.

Underground Injection of CO₂

After CO₂ is captured or produced, it can be compressed and transported to a site where it is injected underground. Some facilities both capture or produce CO₂ and inject it underground onsite.

The primary use of carbon dioxide is for ER. ER helps to mobilize oil and gas in underground hydrocarbon reservoirs, thereby increasing production. While most CO₂ captured or produced is supplied to facilities that conduct ER, a smaller portion is injected underground for other purposes.

 LOCATIONS AND TYPES OF REPORTERS



GHGRP, 2020

Capture and Production of CO₂

- Production Wells - Natural Sources
- Capture Facilities - Industrial Sources

Underground Injection of CO₂

- Enhanced Recovery Locations
- Acid Gas Injection/Disposal Facilities
- ◆ Other

Geologic Sequestration

- ▲ Geologic Sequestration

Data Source: 2020 Greenhouse Gas Reporting Program (as of 8/7/2021)

